

4. INTEGRATION OF WATER MANAGEMENT STRATEGIES

This section documents the water management strategies considered to achieve the IWRMP objectives, how they will work together, and the synergistic effect of employing multiple water management strategies.

4.1. Multiple Water Management Strategies

The participants of the ARB IRWMP recognize that multiple water management strategies are necessary to achieve regional objectives. Data gathering and analysis conducted in previous regional planning efforts, such as the Water Forum Agreement (WFA) Process and ARBCA Regional Water Master Plan (RWMP) outlined the need for several water management strategies in order to manage the region's water supply and water quality. Initial Water Management Strategies included (“*” denotes those water management strategies that must be considered to meet the minimum IRWM Plan standards, pursuant to California Water Code §§ 79562.5 and 79564):

- Water supply reliability *
- Groundwater management *
- Water quality protection and improvement *
- Conjunctive use
- Environmental and habitat protection and improvement *
- Stormwater management *
- Water recycling *
- Water conservation *
- Water and wastewater treatment
- Recreation and public access *
- Land use planning

As additional stakeholders with various regional resource interests became involved with the regional planning process, additional water management strategies were articulated, evaluated and incorporated. The process for determining water management strategies included review of existing planning documents from other resource management entities, stakeholder meetings and discussions, and focused meetings with the individual agencies participating in the ARB IRWMP. In general, water management strategies that were not included were eliminated because those strategies were not under the purview of the current ARB IRWMP participants. The completed list of water management strategies includes:

Section 4

Integration of Water Management Strategies

- Water supply reliability *
- Groundwater management *
- Water quality protection and improvement *
- Ecosystem restoration *
- Conjunctive use
- Environmental and habitat protection and improvement *
- Stormwater management *
- Flood management *
- Water recycling *
- Water conservation *
- Water and wastewater treatment
- Wetlands enhancement and creation *
- Recreation and public access *
- Non-Point Source (NPS) pollution control
- Watershed planning
- Land use planning

Integrating these water management strategies together will help to achieve the ARB IRWMP objectives that were identified in **Section 3**. **Table 4.1** summarizes how water management strategies work together to address each ARB IRWMP objectives by categorizing projects and programs according to their primary water management strategies, then comparing them to the ARB IRWMP objective goals. **Table 4.2** provides descriptions of those projects and programs found in **Table 4.1**.

4.1.1. Water Supply Reliability

Water supply reliability is of significant importance to the participants in the ARB IRWMP. Although the area is surrounded by the American, Sacramento, and Cosumnes Rivers and connected groundwater basins, conditions are constantly evolving. Strains on water supply from contamination, increasing demands, environmental constraints, as well as other factors require many ARB IRWMP Participants to continue developing reliable long-term sources of water. Whether investigating surface water, groundwater or recycled water, individual participants have developed internal plans (Demand Management Studies, Urban Water Master Plans, Recycled Water Master Plans, Water Supply Master Plans, Capital Improvement Plans, etc.) and implemented various projects (water treatment plant expansions, groundwater well development, pipeline installation, recycled water usage, etc.) and programs (American River Conjunctive Use Program, Water Efficiency Program, Groundwater Recharge Programs, etc.) in pursuit of a long-term reliable water supply sources. Many participants have also taken part in joint planning efforts with other participants to assure water supply reliability, through RWMPs, Groundwater Management Plans (GMPs), hydrologic modeling development and refinement, monitoring programs, and other activities. The ARB IRWMP will continue to participate in activities that seek a reliable water supply for many years to come, as is evident by the projects and programs included in **Table 4.1**. **Table 4.1** also demonstrates how water supply reliability integrates with other water management strategies to ensure that one regional objective can be achieved without neglecting another regional objective.

Table 4.1 (continued) Water Management Strategies and ARB IRWMP Objectives

Objectives	Water Supply					Stormwater and Flood Plain Management		Groundwater Management Objectives			Ecosystem Restoration Objectives			Recycled Water Objectives		Potable Water Quality Objectives			Other Objectives				
	Identify and develop specific integrated facilities and operations that will enhance regional and individual drinking water supply availability and reliability.	Identify and cultivate promotion of multi-jurisdictional infrastructure and inter-agency partnerships to enhance total water supply system capacity/capability and reliability to the region.	Recognize the importance of reliable and affordable water supplies for self-supplied and agricultural groundwater users.	Develop (i) a water accounting framework for evaluating the increase in water supply yield of specific projects and programs, and (ii) a financial accounting methodology for equitably distributing capital and operating costs of those projects and programs in relation to the benefits received. These efforts are to support equity discussions between regional partners.	Develop analytical tools to enable evaluation of proposed projects and programs; for example, updating the existing groundwater model for the portion of the ARB IRWMP region that overlies the Central Valley aquifer. The updated groundwater model will assist in groundwater supply management and protection of groundwater quality.	Lead IRWMP regional effort to ensure 100-year flood protection strategies are developed through a collaborative, watershed-wide approach designed to maximize opportunities for comprehensive management of water resources and minimize flooding potential through proactive measures of flood control in unprotected areas.	Minimize impacts from stormwater discharges to receiving water quality in sensitive river systems and the Delta through established BMPs and watershed management activities.	Recognize the region will have up to four adopted GMPs and its stakeholders, each being specific to its own unique groundwater basin but complementary with linkages between recognizing that there is a linkage connecting all of the GMPs. Implementation of the provisions of each GMP will be the responsibility of their respective groundwater basin governance bodies (e.g., SGA for north of the American River in Sacramento County, etc.).	Identify and resolution of issues connected to conjunctive use water management practices and groundwater contamination, such as those at Aerojet and the former McClellan and Mather Air Force Bases.	Evaluate the effectiveness of existing regional groundwater monitoring systems to aid in accurately assessing the condition of the regional groundwater basin in terms of its long-term health and sustainability. The existing monitoring system will be evaluated for its effectiveness in monitoring impacts to groundwater elevations, groundwater gradients, and migration of known contaminant plumes. This effort will include the identification of data gaps and potential threats to the health of the basin, and include a recommendation for improvements to the groundwater monitoring system.	Develop a plan to identify potential areas for ecosystem restoration and environmental and habitat protection and improvement, and how best to implement restoration projects in the region. This plan should include identifying stakeholders and forming appropriate partnerships and establishing other requirements necessary for implementation.	Lead a IRWMP region wide effort to preserve the environmental health and well-being of the region by identifying opportunities to restore and enhance the natural resources of streams and watersheds during the development of regional water management programs and projects in partnership with environmental stewards.	Identify opportunities where the ARB IRWMP objectives are consistent with and assist in meeting the CALFED Bay-Delta Program mission and objectives of water supply reliability, water quality, and ecosystem restoration. The IRWMP planning objectives comply with the solution principles outlined in the CALFED Programmatic Record of Decision by providing a means for identifying projects that reduce conflict in the system, are equitable, affordable, durable, implementable and have no significant redirected impacts.	Identify potential opportunities for expanding recycled water use in urban and agricultural areas and in industrial applications, thereby extending existing water supplies by reducing demands on surface and groundwater supplies.	Reduce Total Maximum Daily Loads (TMDLs) of chemical constituents of primary concern by decreasing effluent flows from wastewater treatment plants to receiving waters. This includes providing recycled water to both urban and agricultural land use areas where use of such water is permissible by state and federal regulatory agencies.	Identify programs and projects that provide safe and affordable alternative water supplies/alternatives for public and private wells impacted by groundwater contamination.	Develop a program for identifying and evaluating the physical, regulatory and legal issues associated with operationally interconnecting adjacent water distribution systems and blending water supplies from different water purveyors and agricultural water districts to achieve the highest water quality that is economically affordable to the end user.	Maintain and protect water quality in groundwater and surface waters through education and local programs that target point sources and non-point sources of contamination.	Document and maintain consistent databases of current land use plans in the region, refine existing water demand estimates for a variety of land uses, and estimate future water supply needs in the region.	Evaluate the regional water efficiency program currently being implemented by RWA and identify potential improvements that could be made to that program.	Develop a strategy for the region's stakeholders to successfully procure external funding for potential projects and programs (including state and/or federal grant funding) as individual members or as a group.	Evaluate data and information from ongoing and recently completed plans for stormwater management, recreational and public access, and environmental and habitat protection/improvement. This information is important for integrating these water management strategies within the ARB IRWMP.	
Wildhawk Groundwater Treatment Plant	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓		✓		
Franklin Groundwater Treatment Plant	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Big Horn Groundwater Treatment Plant	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Sunrise Douglas (Sun Creek) Groundwater Treatment Plant	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Laguna Ridge (Whitelock) Groundwater Treatment Plant	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Bond Groundwater Treatment Plant	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Poppy Ridge Groundwater Treatment Plant	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Indian River/Flaming Arrow Conjunctive Use Pipeline	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Groundwater Production Well Project	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Verner Storage Tank and Pump Station Project	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Mariposa/Madison Transmission Main Project	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Sunset Industrial Area Groundwater Supply Improvements	✓	✓	✓	✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Carriage/Lauppe Transmission Main Project	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Roseville/Citrus Heights Pipeline Interconnection	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
City of Sacramento (POU) North Vineyard - Storage and Booster Pump	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Sheldon Road Storage	✓			✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
West Roseville Specific Plan Storage Tank	✓			✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Fairbairn Water Treatment Plant-Florin Connector (South Cross Tie)	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Replace Existing Wells/Install New Wells	✓			✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Storage Tank	✓			✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
American River Water Supply Project	✓	✓	✓	✓	✓	✓		✓	✓	✓						✓	✓	✓	✓	✓		✓	
Cosumnes River Blvd. Transmission Main	✓			✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
EI Centro Transmission Main	✓			✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
North Cross Tie	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
Regional Pipeline for Surface Water	✓	✓		✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	
City of Sacramento Transmission Main	✓			✓	✓			✓	✓	✓						✓	✓	✓	✓	✓		✓	

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PCWA Watershed Study	✓	✓	✓													✓	✓	✓	✓	✓	✓	✓	
EI Dorado Water and Power Authority Projects/Programs/Activities	✓	✓	✓		✓																	✓	
Land Use Planning*																							
Sacramento Area Council of Governments (SACOG) Blueprint	✓	✓	✓																			✓	✓
Other																							
Water Forum Successor Effort	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sacramento River Water Reliability Study (SRWRS)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
General Plans	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
American River Parkway Plan						✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Agreement between SSWD and RLECWD	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RWA Training Program	✓	✓	✓	✓	✓											✓	✓	✓	✓	✓	✓	✓	✓
Regional Water Authority American River Basin Conjunctive Use Program (ARBCUP)	✓	✓	✓	✓	✓											✓	✓	✓	✓	✓	✓	✓	✓

Table 4.2 Descriptions of Projects and Programs in the ARB IRWMP

Projects and Programs	Responsible Agency(ies)	Description	Primary IRWMP Objective
Habitat Conservation Plans (HCPs) -- Placer Legacy, Natomas Basin, South Sacramento	Various agencies	A non-Federal entity develops an Habitat Conservation Plans (HCP) in order to apply for an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act. The HCP integrates the applicant's proposed project or activity with the needs of the species. It describes, among other things, the anticipated effect of a proposed taking on the affected species and how that take will be minimized and mitigated. Such information must be submitted with any incidental take permit application. Three HCP will be developed in the ARB region: the Natomas Basin HCP, the Placer Legacy Open Space and Agricultural Conservation Program HCP and the South Sacramento HCP.	Ecosystem Restoration
Water Efficient Landscape (WEL) Garden Program	Various water purveyors	A WEL garden is a living landscape demonstration featuring drought-tolerant plants, trees and shrubs. Water efficient gardening allows you to enjoy a beautiful garden while using less water. Currently, San Juan Water District and Fair Oaks Water District have WEL Garden Programs in place and more agencies in the ARB would like to adopt similar programs.	Water Supply
Regional Water Authority American River Basin Conjunctive Use Program (ARBCUP)	Participating Water Purveyors	ARBCUP is a \$43 million project to build and upgrade water facilities throughout the region to better manage surface and groundwater resources. The project's 12 program components include new pipelines, pumps, and other facilities to store, treat, and convey water throughout the region encompassed by the participating agencies. The program objectives include improving the flexibility of the local water system, helping preserve the groundwater basin for use in drought years, promoting implementation of the WFA, and exploring options for future state or federal partnerships to provide broader, system-wide benefits.	Other
Sacramento River Pioneer Reservoir Sites	SAFCA	As part of the American River Common Features Program, this is a joint project between SAFCA and the U.S. Army Corps of Engineers, Sacramento District. The project would stabilize and raise levees and initiate installation of relief wells at Pioneer Reservoir.	Stormwater & Flood Mgmt
Capital Improvement Plans (CIPs)	Water Purveyors	Capital Improvement Plans (CIPs) are completed periodically by each water purveyor in the region for improvement of their own capital facilities. The purpose of a CIP generally includes: Determination of investments in water system capital improvements that will improve each agency's ability to reliably deliver high quality water at a reasonable price, the prioritization of current and future capital improvement needs, plans for necessary long term capital improvements well in advance of their need so that an adequate reserve fund can be maintained, and proposals for revenue determination and allocation as needed to fund agency activities.	Water Supply
IGSM Hydrologic Model Refinement	SGA, SCWA, SSCAWA	Concern has been expressed that the current IGSM model may not accurately represent the unregulated nature of the Cosumnes River during low flow periods and that the Cosumnes River streamflow conditions may not be captured in the regional IGSM. The model refinements are as follows: refine the spatial grid along the Cosumnes River; update the data files to reflect the refined spatial grid; develop daily hydrologic data; incorporate recently developed streambed, stratigraphy, and aquifer characteristics data; incorporate additional calibration wells adjacent to the Cosumnes River; and include subsurface inflow from ungaged watersheds on the eastern boundary.	Water Supply
Wellhead Treatment for Arsenic Removal	RLECWD	Cost estimates were prepared to compare wellhead treatment versus one centralized groundwater treatment facility. Preliminary estimates show that a centralized facility would be more cost effective than wellhead treatment.	Water Quality
Western Placer County Groundwater Storage Study	PCWA	Currently, PCWA is looking into a groundwater banking project that will help create additional water storage. This project will allow the city to pursue both direct and in-lieu recharge opportunities.	Groundwater Management
City of Roseville Dry Creek Corridor Plan	City of Roseville	Currently, the City of Roseville is developing a plan to determine the feasibility a groundwater banking project that will help create additional water storage. This plan will look at both direct and in-lieu recharge opportunities.	Water Quality
Recycled Water Program Expansion	City of Roseville	Currently, Roseville delivers approximately 1,900 AF (619 MG) to its recycled water customers, the largest of which are parks and golf courses. Roseville would like to expand its recycled water system to supply new and existing developments.	Water Recycling
Dry Creek Project	City of Roseville	Currently, Roseville is looking into a groundwater banking project that will help create additional water storage. This project will allow the city to pursue both direct and in-lieu recharge opportunities.	Water Supply
Water Distribution Facilities - North Central Specific Plan Area	City of Roseville	Roseville is looking at alternatives for expanding the water distribution facilities to meet the needs of new development. The water distribution system is being expanded to serve the north central specific plan area. Construction is expected to be complete in 2008.	Water Supply
Western Placer County Groundwater Management Plan (Revision)	City of Roseville, PCWA, City of Lincoln	The purpose of the GMP is to maintain a sustainable, high-quality groundwater resource for the users of the underlying groundwater basin. The GMP articulated the need for improved groundwater monitoring systems, groundwater management systems, and groundwater resource protection. The plan also emphasizes the importance of demand reduction through increases in recycled water use in order to establish a sustainable groundwater system.	Groundwater Management
PCWA Watershed Study	PCWA	A study of mercury transport and transformation in selected waterbodies of the Bear and American River watersheds is needed by the Nevada Irrigation District (NID), PCWA, and EID. The objectives of the study are to quantify loads of mercury (Hg) and methylmercury (MeHg) in the North, Middle, and South Forks of the American River; identify Hg and MeHg "hot spots" at selected abandoned gold mining sites in the North, Middle, and South Forks of the American River; determine MeHg bioaccumulation in fish and invertebrates in stream reaches and reservoirs in the North, Middle, and South Forks of the American River watershed to better define "hot spot" zones.	Ecosystem Restoration
American River Water Supply Project	PCWA	PCWA would like to build a permanent pump station in the American River Canyon. This project will replace the temporary pump station, which currently provides 13,000 AF/yr. A permanent pump station would be designed to supply 35,500 AF/yr.	Water Supply
City of Roseville Water Recycling Program and Projects	City of Roseville	Currently, Roseville delivers approximately 1,900 AF/yr (619 MG) to its recycled water customers, the largest of which are parks and golf courses. Customers irrigate turf and other landscaping with recycled water. The recycled water rate is set at 50% of the potable water rate. In addition to this discount, users do not have to pay a connection fee associated with recycled water.	Water Recycling
Foothill 2 Water Treatment Plant Construction Project	PCWA	This project includes design and construction of a new water treatment plant (30 mgd), which will include an operations building, pretreatment facilities for turbidity and organics reduction/ membrane filtration facilities, a chemical feed building, chemical feed supplies, on-site treated water storage facilities and solids handling facilities.	Water Quality
Zone 40 Groundwater Management Plan	SCWA	Developed in 2004, the purpose of the Zone 40 GMP is to maintain a sustainable, high-quality groundwater resource for the users of the groundwater basin underlying Zone 40. The GMP served as the framework for the Central Sacramento County GMP which covers the entire Central Basin. The Zone 40 GMP articulated the need for improved groundwater monitoring systems, groundwater management systems, and groundwater resource protections. The plan also emphasizes the importance of demand reduction through increases in the use of recycled water in order to establish a sustainable groundwater system.	Groundwater Management
EI Dorado Water and Power Authority Projects/Programs/Activities	EI Dorado Water and Power Authority	EID proposes to implement a watershed-wide monitoring program to identify potential contamination issues that are derived from recreational use in the upper watershed. This project includes the collection and surveying of recreational use data from the USFS, California Department of Parks and Recreation and others. This data would be used to identify areas of concern and select water quality monitoring sites throughout the watershed. Such data would include information on high concentration recreational use areas that may be impacting watershed management, water quality, environmental habitat, and fire risks. Watershed-wide data collection, review and analysis of recreational impacts is a regionally important step in protecting and reducing the potential for contamination of the region's headwaters. This project will identify any water contamination issues that currently reside in the watershed in addition to providing essential baseline data to ensure future protection.	Ecosystem Restoration
Stone Lake Wildlife Refuge	Various local/regional agencies	Every wildlife refuge is required to have a Comprehensive Conservation Plan (CCP) completed by 2012. The CCP will outline refuge goals, objectives, and management strategies. It is a flexible, "living" document that will be updated every 15 years. The CCP ensures that management of the refuge reflects the purposes of the refuge and the mission, policies, and goals of the National Wildlife Refuge System; provides the public with an understanding of the reasons for management actions on the refuge; provides a vision statement for the refuge; ensures the compatibility of current and future uses of the refuge with its purposes; provides long-term continuity in refuge management; and provides budget justification for operation and maintenance and facility development requests.	Ecosystem Restoration
Initial Fisheries and In-Stream Habitat (FISH) Management and Restoration Plan for the Lower American River	Water Forum Successor Effort	Fisheries and In-stream Habitat (FISH) articulates a broadly-shared understanding regarding the management and restoration actions that are most important to improving conditions for priority fish species in the lower American River (LAR). FISH goals and objectives are focused on improving conditions for 5 priority fish species—fall-run chinook salmon, steelhead, splittail, American shad, and striped bass—and are also anticipated to result in improved and/or suitable conditions for other fish species of concern. The recommended actions of the plan include modifying river flow, water temperature regimes, and river characteristics to create a better habitat for the fish.	Ecosystem Restoration
"Be Water Wise" Program	RWA, The Sacramento Bee	In conjunction with the Sacramento Bee, RWA sponsors the "Be Water Wise" program to bring water information to more than 5,000 students each year. The program teaches kids to practice water efficiency in every-day activities. Students in the program learn about water sources and ecology through active learning techniques. Participation in the program is sponsored by RWA.	Water Supply
SGA Data Management System (DMS)	SGA	In its effort to manage the North Area Groundwater Basin, SGA has collected a multitude of groundwater-related data from both water-purveyor member agencies and other agencies such as the California Department of Water Resources (DWR) and the USGS. To better manage the extensive groundwater data and to assess local groundwater conditions, SGA developed a data storage and accounting tool, the DMS. The DMS is a stand-alone application that allows entry, storage, retrieval, and presentation of groundwater and surface water data. However, the DMS needs to be continuously updated in order to make the best use of the system and therefore is an ongoing project.	Groundwater Management
West Roseville Specific Plan (Annexation Area) - 4 Wells	City of Roseville	In order to prepare for shortages in the future and eventual operation of conjunctive use programs currently being studied, additional wells are being planned for Roseville's water system. The plan for this project is to produce 1,800 gpm by 4 wells expected to be completed from 2007-2010. All wells will be constructed with capability to recharge the aquifer directly with treated surface water as a key element required for conjunctive use programs.	Water Supply
HP Well	City of Roseville	In order to prepare for shortages in the future and eventual operation of conjunctive use programs currently being studied, additional wells are being planned for Roseville's water system. This well is planned to produce 1,800 gpm and is expected to be completed in 2009. All wells will be constructed with capability to recharge the aquifer directly with treated surface water as a key element required for conjunctive use programs.	Water Supply
Del Webb Well	City of Roseville	In order to prepare for shortages in the future and eventual operation of conjunctive use programs currently being studied, additional wells are being planned for Roseville's water system. This well is planned to produce 1,800 gpm and is expected to be completed in 2010. All wells will be constructed with capability to recharge the aquifer directly with treated surface water as a key element required for conjunctive use programs.	Water Supply
Folsom Dam Outlet Modifications	U.S. Bureau of Reclamation, SAFCA, local sponsors	Modification to the Folsom Dam outlet works involves enlarging the dam's eight existing river outlets and constructing two new river outlets. The purpose of the modification is to provide for increase in release capacity. These changes are intended to increase the flexibility of the variable storage space operations at the Folsom Dam. An additional project recommends temperature control shutters be mechanized to improve the regulation of water temperature to increase native salmon and steelhead populations.	Stormwater & Flood Mgmt
"Mr. Leaky"	RWA	Mr. Leaky is a water education curriculum for K-4th grade children. The program was developed for children and educators by the RWA and includes an interactive website that helps students recognize water conservation opportunities.	Water Supply
Sacramento Stormwater Quality Partnership	County of Sacramento; Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, and Rancho Cordova	Partnership goals include educating and informing the public about urban runoff pollution, encouraging public participation in community clean-up events, and working with industries and businesses to encourage pollution prevention. The SSQP also requires construction activities to reduce erosion and pollution as well as requiring developing projects to include pollution controls that will continue to operate after construction is complete.	Water Quality
Peterson Water Treatment Plant Improvements	SJWD	Peterson Water Treatment Plant (WTP) improvements are essential to achieve an additional 30 mgd capacity for conjunctive water management. The existing pipeline feeding the WTP was designed for a WTP capacity of 100 mgd, but is currently required to deliver 120 mgd during peak demand periods. The proposed parallel pipeline segment of 54-inch piping is required to increase raw water transmission capacity, to eliminate excessive pumping head on raw water pumping facilities at Folsom Dam, and to allow for redundancy to make necessary repairs to the existing piping and for periodic maintenance of pipe sections. In addition, modifications to the 62-MG treated water storage reservoir (Hinkle Reservoir) will provide the supplementary contact time required for a WTP capacity of 150 mgd. Currently, one of the two main treated water transmission pipes leaving the Peterson WTP is connected directly to the outlet of the Peterson WTP. To be able to utilize chlorine contact time within Hinkle Reservoir for disinfection credit, the connection point needs be relocated to the outlet of Hinkle Reservoir.	Water Quality
Poppy Ridge Groundwater Treatment Plant	SCWA	Poppy Ridge groundwater treatment plant is a 13 mgd plant that will treat water from the 7 wells located along Bruceville Rd. The plant is also located on Bruceville Rd and will service the East Franklin and Laguna Ridge areas.	Water Supply
Water Agreement between SSWD and RLECWD	SSWD, RLECWD	RLECWD is currently negotiating with SSWD for a possible water transfer opportunity. RLECWD would receive water from SSWD to increase water supply reliability for its system.	Other
Storage Tank	RLECWD	RLECWD is planning to construct two 1.5 MG storage tanks to supply the Elverta Specific Plan Area at build-out. Phase I will include the first tank in accordance with the Rio Linda/Elverta Water Supply Plan.	Water Supply
Regional Pipeline for Surface Water	RLECWD	RLECWD plans to participate in sharing a regional transmission pipeline for surface water through yet to be developed agreements. The transmission system would convey large flows to North Central Sacramento County water suppliers from concentrated supply points such as the proposed Sacramento River Diversion in northern Sacramento County. This project would support the District development of capabilities to deliver PF-8 water and allows possible future use of surface water in lieu of or in conjunction with groundwater.	Water Supply

Section 4
Integration of Water Management Strategies

Table 4.2 (continued) Descriptions of Projects and Programs in the ARB IRWMP

Projects and Programs	Responsible Agency(ies)	Description	Primary IRWMP Objective
Replace Existing Wells/Install New Wells	RLECWD	RLECWD plans to replace existing wells over time due to age and condition that will also provide increased system capacity for new customers (installing new larger wells at existing or nearby sites). To provide increased system capacity for new customers, RLECWD will install new wells with a nominal capacity of 1,500 gpm.	Water Supply
American River Parkway Plan	County of Sacramento	Sacramento County is interested in developing three integrated Area Plans for Discovery Park/Tiscornia, Woodlake and Cal Expo. The plan includes the constraints, issues and feasible concepts involved in planning for these three areas; conducting outreach to neighborhood, business and community organizations, with special attention to communities adjacent to this section of the Parkway; designing a highly interactive and engaging process for community workshops; and developing an overall Integrated Conceptual Plan for the project area. The plan will identify lands suited or not suited for environmental and recreational uses.	Other
East Bank Levee Widening Project at RM 78.1	SAFCA	SAFCA is proposing to widen approximately 1,400 feet of the east levee of the Sacramento River beginning about one mile south of Natomas Cross Canal. This section is considered potentially critical for levee system reliability. The project would restore an acceptable geometry for the levee and provide a margin on safety in the event high flows in the river trigger a serious erosion event.	Stormwater & Flood Mgmt
Pocket Area Levee Underseepage	SAFCA	SAFCA observed underseepage along the east levee of the Sacramento River at the City Sump 132 drainage pump station. This project will address water seepage under local levels to provide levee stability. The project will protect the people and property occupying a floodplain that includes the Pocket and Meadowview areas and other portions of the City and County of Sacramento along Morrison Creek and its tributaries.	Stormwater & Flood Mgmt
Meter Retrofitting Program & Activities (e.g., meter installation)	City of Roseville	Signed into law in 2004, the retrofit program will install and upgrade meters throughout Roseville. This program will assist the the City in detecting leaks, budgeting water use, conserving water and help to determine future needs and demands.	Water Supply
Meter Retrofitting Program & Activities (e.g., meter installation)	City of Sacramento	Signed into law in 2004, the retrofit program will install and upgrade meters throughout Sacramento. This program will assist the City in detecting leaks, budgeting water use, conserving water and help to determine future needs and demands.	Water Supply
Meter Retrofitting Program & Activities (e.g., meter installation)	PCWA	Signed into law in 2004, the retrofit program will install and upgrade meters throughout PCWA's service area. This program will assist the PCWA in detecting leaks, budgeting water use, conserving water and help to determine future needs and demands.	Water Supply
South Sacramento Streams Group Levee Project	SAFCA	The South Sacramento County Streams Project provides flood damage reduction to the urban areas of the Morrison Creek and Beach Stone Lake drainage basins in the southern area of Sacramento, as well as around the Sacramento Regional Waste Water Treatment Plant. The project proposes to increase levee height and construct floodwalls in order to provide 100-year flood protection to areas near Morrison Creek, Union House Creek, Elder Creek, and Florin Creek. This project covers a flood plain with a population of more than 100,000 residents and \$2 billion in damageable assets.	Stormwater & Flood Mgmt
SRCSO Recycled Water Program Expansion - Delta Shores	SRCSO, City of Sacramento	SRCSO, in consultation with Sacramento, is evaluating the feasibility of a joint recycled water project in the Delta Shores Development. Delta Shores is about 925 acres (810 acres for east of I-5 portion and 115 acres for west of I-5 portion) and is zoned for residential, commercial, industrial, parks and recreation, and open space. Recently, a 100-acre regional park has been proposed in the east side of Delta Shores. The recycled water system would be expanded to serve schools, parks and public landscape corridors, with an estimated average annual supply of 650 AF/yr.	Water Recycling
Anatolia Groundwater Treatment Plant	SCWA	The Anatolia Groundwater Treatment Facility is located on the eastern side of Sunrise Blvd, approximately 700 feet south of Chrysanthy Rd. The water delivery route follows Excelsior Rd. north to Kieffer Blvd. east to Sunrise Blvd. north. The 30-inch raw water Excelsior Transmission Pipeline will transfer raw groundwater from the Excelsior Road well field to groundwater treatment facility. The treatment facility will have a capacity of 13 mgd and Phase 2 of construction will begin in 2008. The proposed WTP is one of many infrastructure projects required to serve the approved Sunrise Douglas Community Plan/Sunridge Specific Plan area.	Water Supply
Folsom Dam Mini-Raise	U.S. Army Corps of Engineers, SAFCA	The USACE recommends a seven-foot raise in the height of Folsom Dam to reduce flood damages and restore ecosystem functions and values along the lower American River. The project also includes environmental restoration features for wildlife habitat along the lower American River parkway.	Stormwater & Flood Mgmt
Bajamont Water Treatment Plant Expansion	CWD	The Bajamont Water Treatment Plant will be expanded from 17 mgd to 22 mgd. The CWD recently discovered that a plume of groundwater contamination has migrated from the Aerojet Superfund site under the American River into Carmichael's service area. As Carmichael uses a combination of surface and groundwater supplies to meet its water demands, the contamination plume has threatened two of Carmichael's groundwater extraction wells which have been taken off-line as a preventative measure, and will likely threaten additional wells if municipal groundwater pumping near the contamination plume is not curtailed. The proposed additional treatment capacity at Bajamont will replace groundwater supplies lost due to contamination, and will allow Carmichael to curtail groundwater pumping near the leading edge of the contamination plume, thus limiting plume migration to the extent possible.	Water Quality
Bond Groundwater Treatment Plant	SCWA	The Bond Groundwater Treatment Plant is a 6.5 mgd plant located on Bond Rd. This groundwater treatment plant will treat groundwater collected by three wells, which are within one mile of the plant. This plant will service the central service area of Zone 40.	Water Supply
Pocket Area - Sacramento River Erosion Sites	SAFCA	The Reclamation Board, in partnership with the USACE under the Sacramento River Bank Protection Project, is in the process of repairing eight erosion sites along the left bank of the Sacramento River on the waterside of the Sacramento River Flood Control System levee. The combined repair lengths will total 4,436 linear feet and are within a 3.5 mile river reach bounded by Sutterville Road on the North and Freeport Boulevard on the south. The project area is located in Sacramento County in the southern portion of the City of Sacramento and adjacent to the Pocket Area neighborhood.	Stormwater & Flood Mgmt
Carriage/Lauppe Transmission Main Project	CHWD	The Carriage Drive / Lauppe Lane 24-inch Water Transmission Main Project is an interconnection of the existing CHWD 24-inch Water Transmission Main to SSWD's 48-inch Conveyance Pipeline including turnouts for Cal Am. The water transmission main will connect to the existing 24-inch outlet on the SSWD 48-inch Pipeline at Antelope Road and Lauppe Lane. The main will continue south on Carriage Drive in the Cal Am service territory and connect to existing CHWD 24-inch water transmission main on Auburn Blvd. In total, 5,960 linear feet of 24-inch water transmission will be installed. This new water transmission main will improve water supply reliability by contributing to interagency water exchanges and increasing the use of groundwater when appropriate to address emergencies, drought and environmental needs. Participants in this project include: CHWD, Cal Am and SSWD.	Water Supply
Central Sacramento County Groundwater Management Plan	SCWA	The Central Sacramento County GMP was completed in February 2006. It provides a management plan for the protection and preservation of groundwater resources as well as underscoring stakeholder interests and initiatives. The establishment of the plan ensures protection of groundwater quantity and quality and assists in monitoring and maintaining groundwater elevations.	Groundwater Management
Lincoln Recycled Water Distribution Pipeline Expansion - Western Placer County	City of Lincoln	Lincoln has constructed the initial phase of its Regional Wastewater Treatment and Reclamation Facility (WWTRF). A key element for distribution of the recycled water produced by the WWTRF is to complete the pipelines and pump stations to distribute high-quality recycled water to commercial, industrial and institutional users currently supplied with surface water from PCWA. The project includes extending and connecting existing City force mains from the City's WWTRF in southwest Lincoln to recycled water use locations in downtown Lincoln. Pipelines will be sized to accommodate additional future recycled water uses.	Water Recycling
Stoneridge Zone 2 Storage Tank	City of Roseville	The Roseville water system currently has 28 MG of storage capacity and is projected to need a total of 49 MG at system build out. This storage tank will have a capacity of 3 MG planned for completion in 2009.	Water Supply
West Roseville Specific Plan Storage Tank	City of Roseville	The Roseville water system currently has 28 MG of storage capacity and is projected to need a total of 49 MG at system build out. This storage tank will have a capacity of 6 MG planned for completion in 2008.	Water Supply
Northeast Storage Tank	City of Roseville	The Roseville water system currently has 28 MG of storage capacity and is projected to need a total of 49 MG at system build out. This storage tank will have a capacity of 6 MG planned for completion in 2013.	Water Supply
North Industrial Storage Tank	City of Roseville	The Roseville water system currently has 28 MG of storage capacity and is projected to need a total of 49 MG at system build out. This storage tank will have a capacity of 6 MG planned for completion in 2018.	Water Supply
Rosemont Conjunctive Use Pipeline	City of Sacramento	Sacramento has a wholesale water service agreement for American River water, within the City's American River Place of Use (POU) with SCWA and Cal Am. The proposed project includes the construction of 5,500 linear feet of 24-inch diameter water transmission main and related facilities from an existing water transmission line in Folsom Boulevard to the Cal Am/Rosemont service area near Watt Avenue. The proposed project replaces groundwater supplies that have been lost due to industrial contamination. Furthermore, the project extends and optimizes surface water deliveries in Sacramento's American River POU, reducing, and during certain periods curtailing as much as 14,600 AF/year of groundwater extraction in the over-drafted Central Groundwater Basin.	Water Supply
Vineyard-Florin Gap Conjunctive Use Pipeline	City of Sacramento	Sacramento has a wholesale water service agreement for American River water, within the City's American River Place of Use (POU) with SCWA. The proposed project includes the construction of 14,000 LF of 24-inch diameter water transmission main and related facilities from the City's Florin Reservoir, east along Elder Creek Road to the SCWA delivery location at South Watt Avenue. The proposed project extends and optimizes surface water deliveries in the City's American River POU, reducing, and during certain periods eliminating 10,700 AF/year of groundwater extraction in the over-drafted Central Groundwater Basin.	Water Supply
Cosumnes and Mokelumne Rivers Floodplain Integrated Resources Management Plan	SSCAWA	The Cosumnes and Mokelumne Rivers Floodplain Integrated Resources Management Plan (CMRIMP) is a multi-agency effort designed to develop a management strategy that facilitates effective enhancement of floodplain conditions and functions of the lower Cosumnes and Mokelumne rivers. The objectives of this project are to identify opportunities that: 1) protect and enhance floodplain, riparian, and riverine ecosystems; 2) improve flood management and reduce flood damage to structures, levees, and agriculture; and 3) increase groundwater recharge associated with the floodplain. The CMRIMP culminates in an Integrated Resources Management Plan that identifies a preferred management strategy and incorporates the principles of adaptive management in the succeeding phase of project implementation.	Stormwater & Flood Mgmt
Cosumnes River Fish Passage Project	SSCAWA	The Cosumnes River Fish Passage Project is a study of the streamflow and water supply needs for adult and juvenile salmon passage in the Cosumnes River in Sacramento and Placer counties. The objective of the study is to assess the water supply and water resources infrastructure on the Cosumnes River, and to compare them to the water needs for successful upstream and downstream migrations of chinook salmon. Where there are deficits, viable flow alternatives from the Cosumnes River and other sources and/or infrastructure necessary to make up the deficit will be identified. The ultimate goal is to describe a water supply system that can meet the current needs of agricultural and municipal uses, as well as those for salmon passage, and not impact rivers and streams outside the Cosumnes River watershed.	Ecosystem Restoration
Cosumnes River Flow Augmentation Project	SCWA	The Cosumnes River Flow Augmentation Project will provide supplemental water to the Cosumnes River that will provide for local groundwater recharge and fish passage improvements for fall-run chinook salmon. The SCWA will provide up to 5,000 AF of water annually through the Folsom South Canal to an existing turnout to the Cosumnes River. SSCAWA will manage releases into the Cosumnes River to pre-wet the river channel prior to the onset of natural fall flows in the lower reaches of the river. The project will provide information regarding the effectiveness of releasing supplemental water into the Cosumnes River for groundwater recharge and for the restoration of historical fall flow patterns critical for successful salmon migration.	Ecosystem Restoration
SSWD Demand Management Study	SSWD	The Demand Management Study evaluates the effectiveness of the Water Forum Agreement Water Conservation BMP's within the region covered by the WFA. All districts and municipalities are faced with considerable challenges to fund all competing priorities. The study aims to evaluate and identify the most effective order in which to implement the full range of BMPs, so a more successful program could be supported by all interests while achieving the goal of reducing water demands in the area at a faster rate. It could also produce more flexibility in the water supply available from the American River and the groundwater basin. Information developed from the study would support both the interests of the water suppliers and the environment.	Water Supply
Cosumnes River Blvd. Transmission Main	City of Sacramento	The development of this project is recommended by the 2005 City of Sacramento Master Plan. The plan found that many of the pipelines in the city exhibit significant headloss resulting in a loss of pressure throughout the system. Pipeline upsizing and expansion improvements are recommended to alleviate this problem. Its purpose is to improve water supply reliability and provide water to the Delta Shores area.	Water Supply
Panhandle Transmission Main	City of Sacramento	The development of this project is recommended by the 2005 City of Sacramento Master Plan. The plan found that many of the pipelines in the city exhibit significant headloss resulting in a loss of pressure throughout the system. Pipeline upsizing and expansion improvements are recommended to alleviate this problem. The \$1 million project will serve the Panhandle area.	Water Supply
Fairbairn Water Treatment Plant-Florin Connector (South Cross Tie)	City of Sacramento	The development of this project is recommended by the 2005 City of Sacramento Master Plan. The plan found that many of the pipelines in the city exhibit significant headloss resulting in a loss of pressure throughout the system. Pipeline upsizing and expansion improvements are recommended to alleviate this problem. The Florin connector will serve south county Wholesalers and the south part of Sacramento.	Water Supply
El Centro Transmission Main	City of Sacramento	The development of this project is recommended by the 2005 City of Sacramento Master Plan. The plan found that many of the pipelines in the city exhibit significant headloss resulting in a loss of pressure throughout the system. Pipeline upsizing and expansion improvements are recommended to alleviate this problem. The purpose of the \$2.9 million dollar project is to serve the development of the Airport/Metro Air Park.	Water Supply
North Cross Tie	City of Sacramento	The development of this project is recommended by the 2005 City of Sacramento Master Plan. The plan found that many of the pipelines in the city exhibit significant headloss resulting in a loss of pressure throughout the system. Pipeline upsizing and expansion improvements are recommended to alleviate this problem. The tie is necessary to improve water supply reliability and to serve the wholesale agencies served by Sacramento.	Water Supply

Table 4.2 (continued) Descriptions of Projects and Programs in the ARB IRWMP

Projects and Programs	Responsible Agency(ies)	Description	Primary IRWMP Objective
South City Reservoir and Pump Station	City of Sacramento	The development of this project is recommended by the 2005 City of Sacramento Master Plan. The plan found that many of the pipelines in the city exhibit significant headloss resulting in a loss of pressure throughout the system. Pipeline upsizing and expansion improvements are recommended to alleviate this problem. This \$11.7 million project will boost pressure in the south part of Sacramento.	Water Supply
Fairbairn Intake Pump to serve City of Sacramento and SCWA Zone 40	City of Sacramento	The development of this project is recommended by the 2005 City of Sacramento Master Plan. The plan found that many of the pipelines in the city exhibit significant headloss resulting in a loss of pressure throughout the system. Pipeline upsizing and expansion improvements are recommended to alleviate this problem. This 21 mgd pump will provide reliable drinking water to the SSWD.	Water Supply
Recycled Water Program Storage Reservoir	EID	EID has a mandated recycled water program which requires all new development to use recycled water for most non-potable uses. In order to serve those customers with recycled water, a seasonal storage reservoir must be constructed to capture winter flows of treated wastewater. This project consists of the construction of a 2,500 to 5,000 AF storage reservoir in the El Dorado Hills Basin to store winter flows of treated wastewater for distribution during the irrigation season. Additional facilities required to provide a complete working system include: pump station at the reservoir, pump station at the wastewater treatment plant, pipelines to the reservoir, and associated facilities. Seasonal storage allows EID to provide a greater supply of recycled water for non-potable uses thus reducing the demand for potable water. Reductions in potable water demand over time translate into the more efficient use of water and the need for less water over time. Benefits would be shared by the South Fork of the American River and the Cosumnes River systems that eventually benefit the Delta.	Water Recycling
Ethan Way/Silica Avenue Conjunctive Use Pipeline	City of Sacramento	The Ethan Way / Silica Ave Pipeline Project is the next phase of the North Sacramento Cross Tie Program. This project will include constructing 8,800 linear feet of 54-inch diameter pipeline from the existing 54-inch in Ethan Way at Alta Arden Way, north on Ethan Way to Silica Ave, west on Silica Ave to Clay Ave. This pipeline project is required to provide surface water needed for the WFA conjunctive use program and will improve water supply reliability in the region. This pipeline can supply 57,000 AF/yr of surface water to SSWD and North Sacramento.	Water Supply
City of Galt Wastewater Treatment Facilities Plan	City of Galt	The Feasibility Study Report was completed in January 2005. It identifies options for implementation of an appropriate strategy for compliance with anticipated future NPDES permit requirements as expeditiously as possible. Alternatives identified included various discharge scenarios, wastewater export, and enhanced effluent recycling options.	Water Quality
Gardenland Flood Management, Habitat Restoration, and Recreation Project	SAFCA	The Gardenland Sand and Gravel mine site is a 123-acre site on a floodplain terrace located within the designated boundaries of the American River Parkway. SAFCA proposes to acquire the site, restore it, and incorporate it into the publicly-owned American River Parkway. The site has been mined for decades and is now used for sorting, distributing, and recycling soil and construction debris. The dominant feature is a steep-sided, 62-acre mine pit that is now a lake, hydraulically linked to the American River through alluvial soil. It hosts non-native fish and vegetation, and the graded soils around the pit are either bare or host non-native vegetation and weeds. The site operators mow and disc much of the proper to prevent the establishment of vegetation, particularly woody vegetation that would inhibit mining operations. Acquisition of the site would remove two occupied dwellings and various structures and equipment from the floodway. It would provide an opportunity to restore the site and eliminate the ongoing potential for sedimentation and water pollution from the on-site storage of piles of soil and debris of unknown origin.	Ecosystem Restoration
Sacramento River Water Reliability Study (SRWRS)	City of Sacramento, City of Roseville, SSWD, PCWA	The goal of the SRWRS is to develop a water supply plan that is consistent with the WFA objectives of pursuing a Sacramento River diversion to meet water supply needs of the Placer-Sacramento region, and promoting ecosystem preservation along the lower American River. The SRWRS study area includes the region in Placer and Sacramento counties, north of the American River and east of the Sacramento River.	Other
Laguna Creek Watershed Assessment	SCWA	The goals are to assess watershed conditions and develop a balanced approach to address water quality improvement, habitat protection, flood and drainage conditions, recreation, and open space conservation in the Laguna Creek watershed. Another goal is to prepare a watershed management plan to assess environmental conditions, identify problems and sources of pollution, and recommend prioritized projects. Additionally, there are goals to involve residents, schools, and public agencies in watershed protection and creek stewardship projects.	Ecosystem Restoration
SGA Contaminant Committee	SGA	The goals of the SGA Contaminant Committee are to: raise the level of awareness of the regulatory agencies to our concerns, insist that the responsible parties fully delineate and contain all contaminant plumes, ensure that the responsible parties expeditiously proceed with cleanup efforts and have the responsible parties develop a plan for alternative water supplies in advance of contamination being detected in public water supply wells. To date the committee has met with USEPA, the Regional Water Quality Control Board and the Department of Toxics. The committee is in the process of setting up additional meetings with State and Federal Officials.	Water Quality
Mariposa/Madison Transmission Main Project	CHWD	The Mariposa Avenue / Madison Avenue 24-inch Water Transmission Main Project consists of 18,700 lf of 24-inch water transmission main from the intersection of Greenback Lane and Mariposa Avenue in Citrus Heights to and possibly beyond the Palm Avenue Storage / Blending Tank. Participants in this project include: CHWD, FOWD, CWD, SSWD and Cal Am.	Water Supply
Memorandum of Agreement for the Management for Water and Environmental Resources Associated with the Lower Cosumnes River	SSCAWA	The Memorandum of Agreement for the Management for Water and Environmental Resources Associated with the Lower Cosumnes River (MOA) has been entered into by SCWA, SSCAWA, and TNC. The goal of the MOA is to restore and maintain key functions of the Cosumnes River corridor while furthering conjunctive use in the agricultural areas between the American and Cosumnes rivers and from the Cosumnes River to the southern boundary of Sacramento county. The signatories of the MOA hope to ensure the viability of both the agricultural economic base and ecosystems associated with the Cosumnes River. Through the MOA, the signatories have committed to working together to enhance conjunctive use within the region in order to reduce groundwater pumping and improve flow conditions in the Cosumnes River.	Ecosystem Restoration
Mesa Verde Groundwater Production Well	CHWD	The Mesa Verde Groundwater Storage and Recovery Project consists of an 1,800 gpm groundwater well in the southwest corner of Mesa Verde High School as well as a pumping plant, disinfection equipment, treatment equipment and underground piping. This new groundwater well will improve water supply reliability by contributing to interagency water exchanges and increasing the use of groundwater when appropriate to address emergencies, drought and environmental needs. Participants in this project include: CHWD, SJWD, FOWD, OVWC, Folsom, Cal Am and SGA.	Water Supply
Mitchell Farms Blending and Storage Facility	CHWD	The Mitchell Farms Storage / Blending Tank Project consists of a 2 MG water storage and blending tank adjacent to the Proposition 13 Mitchell Farms Groundwater Storage and Recovery Project and existing 18-inch water transmission main. This facility will be used to blend surface water and groundwater and to provide storage for peaking and emergencies thereby freeing-up treatment plant capacity for same use by others.	Water Supply
City of Sacramento (POU) North Vineyard - Storage and Booster Pump	SCWA	The North Vineyard Treatment Plant would be located in an area of new development bounded roughly by Elk Grove-Florin Road, Gerber Road, Vineyard Road, and Florin Road. The treatment, storage, and booster facility and on-site well would be constructed on a 6-acre parcel. The project will consist of two 1,500 gpm filter units with provisions for a third filter, one 2 MG welded steel tank with provisions for a second tank, one 150,000 gallon welded steel backwash tank with provisions for a second backwash tank, booster pumps, chemical treatment facilities, an on-site well pump station and operations, chemical storage, and control building.	Water Supply
American River Basin Cooperating Agencies (ARBCA) Regional Water Master Plan (RWMP)	Participating Water Purveyors	The objective of the RWMP was to identify the facilities and operational agreements necessary to implement the WFA. Phase I identified and described a menu of project and program alternatives for implementing the WFA north of the American River. Phase II provided detailed hydrologic, engineering, and legal/institutional evaluations of those projects and programs that best aligned with the goals and objectives of the WFA.	Water Supply
Palm Avenue Blending and Storage Facility	CHWD	The Palm Avenue Storage / Blending Tank Project consists of a 2 MG storage tank, fed by gravity from SJWD, located on the undeveloped Carmichael Recreation and Park District Property. While located in CHWD, the tank site would also be near the boundaries of FOWD, CWD, SSWD and Cal Am. Participants in this project include: CHWD, FOWD, CWD, SSWD and Cal Am.	Water Supply
TNC River Management and Conjunctive Management Opportunities of the Cosumnes River	TNC	The plan includes installation of piezometer transects near the river to complement existing UCD monitoring well network and to provide much needed, near-channel data regionally. New data will be used to refine and recalibrate existing UCD river-aquifer model and will help couple the model dynamically to the latest Sacramento County groundwater model. Through the use of monitoring data over the first one to two years and complementary modeling analysis of the data, a water management plan will be defined and adaptively modified over the ensuing years based on further monitoring and data analysis.	Ecosystem Restoration
Sacramento River Corridor Planning Forum	SAFCA	The Planning Forum addresses riverfront development, public access and flood management issues affecting the reach of the Lower Sacramento River extending from the Fremont Weir to Courtland. The Forum's principal focus has been developing guidelines for implementing the updated Sacramento Riverfront Mast Plan along the Lower Sacramento River between the mouth of the American River and the mouth of the Sacramento River Deep Ship Channel.	Ecosystem Restoration
Franklin Groundwater Treatment Plant	SCWA	The project consists of the construction and operation of non-potable storage tank/pump station facility and a 7 mgd groundwater treatment plant located on the east frontage of Franklin Boulevard in the City of Elk Grove. The Franklin Boulevard WTP is planned to be a dual-service facility that will separately handle potable water supplied by groundwater wells and recycled water supplied from the Sacramento Regional Wastewater Treatment Plant (SRWTP). At buildout, the non-potable tank will store recycled water delivered from the SRWTP through a 24-inch recycled main and will pump recycled water into the SCWA Zone 40 recycled water system to meet irrigation needs. The potable portion of the facility will separately treat local groundwater collected by up to five wells in the region and store treated water in a tank. It will then be pumped into the Zone 40 water system upon demand.	Water Supply
Lincoln Recycled Water Distribution System Expansion - Southwest Placer County	City of Lincoln	The project includes converting force mains to recycled water lines, extending and connecting existing recycled water lines from the City's regional wastewater treatment facility in southwest Lincoln to reclaimed water use locations. Current recycled water demands are estimated at 1,400 AF/yr in downtown Lincoln, specifically the Sierra Pacific Industries lumber mill and at local schools and public parks. Proposed recycled water pipelines are sized to accommodate additional future recycled water uses, and include related pumping facilities to manage system pressures for recycled water users. Connections to median landscapes and other uses are already plumbed with recycled water improvements (purple pipe) along the intended pipeline main distribution route.	Water Recycling
Wildhawk Groundwater Treatment Plant	SCWA	The project is currently under construction on a five acre site with an estimated completion in the spring of 2006. The plant project includes of two 1.5 MG treated water storage tanks and the equipping of two offsite wells. The plant will deliver water to SCWA's system of transmission and distribution pipelines. Estimated cost of the plant is \$10 million.	Water Supply
Groundwater Production Well Project	SSWD	The project proposes to construct two new ASR wells in SSWD's north service area. The production wells replace existing groundwater extraction wells in the district and are purposefully located north of the region-wide groundwater cone of depression. This location (in the northern service area) is intended to prevent and avoid interactions with regional groundwater contamination plumes near the southern portion of the district. Furthermore, the proposed wells will have injection capability that once permitted, will allow for 5,000 AF/yr of additional groundwater storage during off-peak periods in alignment with the WFA and regional conjunctive water management and groundwater management objectives. During dry periods, groundwater usage will increase to leave additional surface water in the American River for habitat protection and to meet water quality objectives.	Water Supply
Verner Storage Tank and Pump Station	SSWD	The project proposes to construct a storage tank and pump station that would connect to SSWD's Groundwater Production Well Project. The tank and pump station would be utilized to regulate water flow in and out of the wells.	Water Supply
Federal Groundwater Contamination Cleanup Efforts	Federal agencies (e.g., U.S. Air Force, U.S. EPA)	There are various groundwater cleanup efforts in the ARB designed to remediate groundwater that has been contaminated by U.S. Air Force Base activities or their contractor Aerojet. The remediated groundwater is either discharged to a water channel or utilized for irrigation or other aesthetic purposes.	Water Quality
Eastern Sacramento County Replacement Water Supply Project	SCWA	The project requires Aero Jet/Boeing to decontaminate the groundwater underlying their property. The groundwater will be treated to state standards and discharged to the American River where downstream users may recover the treated water. These downstream water purveyors will further treat the water and distribute water to their service areas.	Water Supply
Freeport Regional Water Project	FRWA	The project will provide for the diversion of water from the Sacramento River and delivery to SCWA and EBMUD customers which will meet the water demands of urban interest in the region while providing a reliable water supply for the region's economic health. Furthermore the project will supplement regional groundwater pumping with surface water with the intent of reducing groundwater pumping of the regional aquifer to a sustainable level. The project includes intake facilities and a 185 mgd capacity pipeline with associated facilities.	Water Supply
County of Sacramento Low Flow Drainage Project	County of Sacramento	The project's primary objective is to reduce pollutant discharges in stormwater runoff. Additionally, the project will contribute to the provision of reliable and safe water supply and to the maximization of beneficial use of existing surface water entitlements. The project provides urban water runoff water quality protection to the Lower American River by decreasing bacterial loading significantly enhancing protection of the river for aquatic wildlife, recreational and potable water uses of the resource.	Stormwater & Flood Mgmt
Big Horn Groundwater Treatment Plant	SCWA	The proposed project consists of the construction of a 13 mgd groundwater treatment and storage facility, a well on the treatment and storage facility site, and up to six off-site wells and is located in the City of Elk Grove. The treated water and raw water conveyance pipelines will be installed in conjunction with associated road improvements. Water supplied by the proposed project will be used in the approved Laguna Ridge Specific Plan (LRSP) area and existing development within the SCWA Zone 40 service area.	Water Supply
Groundwater Production Well Project	OVWC	The proposed project involves the construction of a new groundwater extraction well that will be located in either Orange Vale Park or Almond Park with an estimated 1,500 gpm capacity. The project includes a new well with an electrically powered motor and pump together with chlorine injection equipment. Emergency power supply is included to provide operational reliability. The project will provide up to 1,000 AF/yr of reliable water supply for OVWC, creating the possibility of forgoing portions of its surface water supplies, especially during constrained hydrologic periods, required as part of the WFA.	Water Supply
Fair Oaks Boulevard Groundwater Production Well	CHWD	The proposed project is to construct a 1,000-gpm groundwater well in the northwest quadrant of the intersection of Fair Oaks Blvd and Madison Avenue, southeast of Sunrise Mall in Citrus Heights. The proposed project will allow CHWD to forgo up to 800 AF/yr of its surface water supplies, especially during constrained hydrologic periods, required as part of the WFA. Furthermore, the project will assist in meeting the ongoing replacement water supply needs of neighboring CWD.	Water Supply
Old Auburn Road Groundwater Production Well	CHWD	The proposed project is to construct a 1,500-gpm groundwater extraction well in the southeast quadrant of the intersection of Old Auburn Road and Mariposa Avenue in Citrus Heights. The proposed project will allow CHWD to forgo up to 900 AF/year of its surface water supplies, especially during constrained hydrologic periods, required as part of the WFA. Furthermore, the project will assist in meeting the ongoing replacement water supply needs of neighboring CWD.	Water Supply

Section 4
Integration of Water Management Strategies

Table 4.2 (continued) Descriptions of Projects and Programs in the ARB IRWMP

Projects and Programs	Responsible Agency(ies)	Description	Primary IRWMP Objective
Woodcreek North Aquifer Storage and Recovery Project	City of Roseville	The proposed project is to construct a 1,500 - 3,000-gpm groundwater extraction well with injection capability located on Woodcreek Oaks Boulevard in northwest Roseville. The proposed project will allow Roseville to forgo up to 800 to 1,600 AF/yr of its surface water supplies, especially during constrained hydrologic periods required as part of the WFA. Furthermore, the project is designed to complement regional groundwater management by injecting and storing treated water in the groundwater basin during off-peak periods.	Water Supply
Groundwater Production Well Improvement Project	OVWC, SJWD	The proposed project would rehabilitate two existing groundwater extraction wells of proven structural integrity and water quality. OVWC Well No. 1 is located in the rear portion of the OVWC Corporation Yard and is connected (currently for emergencies) to the distribution system via an existing 10-inch main. OVWC Well No. 2 is located along Chestnut Avenue and is currently connected to the distribution system via an 8-inch pipe connection. Both rehabilitation projects will provide up to 2,000 AF/yr of reliable water supply for OVWC, creating the possibility of forgoing portions of its surface water supplies, especially during constrained hydrologic periods, required as part of the WFA.	Water Supply
Cosumnes River Preserve Management Plan	TNC	The purpose of the plan is to improve watershed management for the Cosumnes River Preserve management area. Specific project goals include developing a GIS database to consolidate existing data and facilitate ongoing monitoring and provide for long-term sustainability of management actions, and to build local support and capacity for restoration and conservation. This plan also establishes the objectives and guidelines to restore and protect the habitat and wildlife associated with the Cosumnes River.	Ecosystem Restoration
Lower Sacramento Regional Project	SAFCA	The purpose of the planning effort is to evaluate the feasibility of a project that would lower the water surfaces and thereby reduce the risk of flooding along the lower Sacramento River Flood Control System. The goal is to enable the system to carry more water at lower levels thereby increasing the system's flexibility.	Stormwater & Flood Mgmt
River Corridor Management Plan	Water Forum Successor Effort	The purpose of the three year River Corridor Management Plan (RCMP) is to institute a cooperative approach to managing and enhancing the lower American River (LAR) corridor's aquatic and terrestrial ecosystems, flood control systems, and recreation values within the framework of the 1985 American River Parkway Plan (Parkway Plan). Implementation of the RCMP is expected to improve and increase aquatic and terrestrial habitats and improve ecological functions in a manner that will contribute to the health of the targeted species found in the LAR, preserve the flood-carrying capacity and ensure the long-term reliability of existing and planned flood-control improvements, and preserve and enhance the LAR's wild and scenic recreation value.	Ecosystem Restoration
PCWA Water Supply Infrastructure Plan (WSIP)	PCWA	The purpose of this plan is to provide a comprehensive, detailed evaluation of PCWA's water supplies and to identify the possible alternatives of water diversion, treatment, and conveyance facilities to maximize the use of PCWA's water entitlements.	Water Supply
RMCS D Water Recycling Program	RMCS D	The Rancho Murrieta Community Services District Water Recycling Program uses tertiary treated recycled water to irrigate golf courses, parks and common areas. Two golf courses with a combined area of 238 acres have a peak demand of about 3 mgd during the summer months.	Water Recycling
Sacramento Stormwater Management Program & Activities	City of Sacramento, SCWA	The regional stormwater program comprehensively and regionally addresses the majority of pollutants and pollutant paths in nonpoint source runoff.	Water Quality
Roseville/Citrus Heights Pipeline Interconnection	CHWD	The Roseville / Citrus Heights Interconnection Project will improve the connectivity of the Roseville and CHWD water distribution systems to facilitate the exchange of water during emergencies and drought and to provide access to redundant sources of surface water treatment. The project consists of the Mariposa Avenue / Keith Drive 8-inch interconnection, the Fair Way / Kensington Drive 12-inch interconnection, the Blossom Hill Way / Sandringham Way 10-inch interconnection, the Bonnie Oak Way 6-inch interconnection and the Crestmont Avenue 6-inch interconnection. This new interconnection project will improve water supply reliability by contributing to interagency water exchanges, providing access to multiple treatment plants, and increasing the use of groundwater when appropriate to address emergencies, drought and environmental needs. Participants in this project include: Roseville, CHWD and SJWD.	Water Supply
Roseville Water Treatment Plant Expansion	City of Roseville	The Roseville Water Treatment Plant will be expanded from the current capacity of 60 mgd to the planned full capacity of 100 mgd. This expansion is needed to meet peak water demands projected for the service area which is currently converting from agricultural to urban land uses. Further, this expansion will deliver surface water to areas that have previously utilized groundwater supplies, thus promoting groundwater recharge. Through design and construction of improved solids handling facilities, this facility will remedy current difficulties in treating additional water during non-peak demand periods. The proposed treatment plant upgrades, combined with other facility improvements will be able to convey surface water to other agencies or areas of use for in-lieu conjunctive water management programs or through direct injection to the groundwater aquifer once permitted.	Water Quality
North Area Round Table	SAFCA	The Round Table addresses fiscal issues and stream management and recreation access issues associated with Steelhead Creek, Dry Creek, Arcade Creek and Magpie Creek. Issues addressed by the Round Table include the management and clean-up of McClellan Park, the former Air Force Base, creek restoration plans, recreational amenities surrounding creek restoration including biking and hiking trails, stream-bank restoration and Hayer Dam Site Renovation.	Ecosystem Restoration
RWA Training Program	RWA	The RWA provides training in Water Efficient Business Practices and Survey Methods, Groundwater in the Sacramento Region, and Landscape Water Management Courses for Professionals. The Water Efficient Business workshops include instructions on efficient practices as well as calculations to estimate water savings. The Groundwater course identifies challenges to sustainable groundwater and to the basin at large. The Landscape Water Courses prepares landscape professionals to evaluate irrigation systems and develop efficient irrigation schedules.	Other
Sacramento Area Council of Governments (SACOG) Blueprint	SACOG	The SACOG Board of Directors adopted the Preferred Blueprint Scenario in December 2004. The Blueprint is a bold vision for growth that promotes compact, mixed-use development and more transit choices as an alternative to low density development. The plan includes protection of water sources, farmland and vernal pools.	Other
General Plans	Various agencies	The Sacramento County's General Plan is undergoing its first update since it was last adopted in 1993. This update is necessary to plan for growth in the next planning cycle (2005-2030) as well as to address new emerging planning issues. Some of the topics to be addressed in the Update Project are: commercial corridors, economic development, holding capacity, policy analysis, smart growth planning and mature communities (creation of a new policy in the General Plan's Land Use Element that provides tools and techniques for the revitalization and continued enhancement of well-established suburban communities in the unincorporated areas of the county).	Other
SRWRS Elverta Diversion	Various water purveyors and agencies/organizations	The Sacramento River Water Reliability Study includes participation from the following agencies: Reclamation, PCWA, SSWD, Roseville and Sacramento. The goal of the SRWRS is to develop a water supply plan that is consistent with the WFA objectives of pursuing a Sacramento River diversion to meet water supply needs of the Placer-Sacramento region and promoting ecosystem preservation along the lower American River. The SRWRS Elverta Diversion will be located on the Sacramento River between the Feather River confluence and the American River confluence, most likely near Elverta Road for its advantageous bathymetric conditions.	Water Supply
SGA Groundwater Management Plan (GMP)	SGA	The SGA Groundwater Management Plan represents a critical step in establishing a framework for maintaining a sustainable groundwater resource for groundwater users overlying the basin in Sacramento County north of the American River. This plan represents a starting point for basin management; it is intended to be adapted as more information about the basin is acquired and as the demand for groundwater changes. It includes specific goals, objectives and an action plan to provide a road map for coordination among the 14 overlying water purveyors. SGA and its members are committed to the regional objectives established by the WFA, and these objectives are incorporated into the plan.	Groundwater Management
Sheldon Road Storage	SCWA	The Sheldon Road Storage tank is a 0.5 MG tank that is located on Sheldon Road west of Highway 99. This tank will be filled with water during off-peak hours and pumped during peak usage time.	Water Supply
South Sacramento County Basin Groundwater Management Plan	SSCAWA	SSCAWA, the City of Galt, RMCS D, and TNC are teaming together to develop a Groundwater Management Plan (GMP) that represents the South Basin of Sacramento County. This GMP will be developed to address the growing pressure on existing groundwater resources and on the natural environments that are now or were historically dependant on groundwater. The GMP will identify the participant's goals and objectives for groundwater management and will set out an implementation plan for reaching those goals and objectives and monitoring the success of the GMP.	Groundwater Management
SRCS D Water Recycling Master Plan	SRCS D	The purpose of the SRCS D Water Recycling Master Plan (WRMP) is to identify and evaluate areas within the greater Sacramento Area for potential use of recycled water. The WRMP will work closely with water purveyors and users, land use planning authorities, development interests and other stakeholders to identify suitable areas to use recycled water as a water supply for irrigation, industrial uses and wetlands enhancement. SRCS D has identified a water recycling goal of 30 to 40 mgd by 2020. Currently, SRCS D has a water recycling program, operated with SCWA as a water purveyor partner, that delivers up to 2.7 mgd of recycled water to the Laguna West Area. The Sacramento Region will benefit from the development of a WRMP and successful implementation of preferred WRMP alternatives by gaining a new, reliable water supply that can augment existing surface and ground water supplies. Additionally, expansion of SRCS D's water recycling program will reduce future SRWTP effluent discharges to the Sacramento River.	Water Recycling
Water Forum Agreement (WFA) State of the River Report	Water Forum Successor Effort	The State of the River Report is a living document discussing the current conditions of the Lower American River. This report is intended to educate the public about the various programs and projects that help to protect the Lower American River. Therefore it is imperative that the report be updated at regular intervals to keep the public aware of the necessity of these programs. Information found in this report includes the following information: the condition of various native fish and programs meant to improve their populations; programs that are maintaining/improving habitat areas; programs that help achieve water quality goals; and programs that maintain the levee system.	Water Quality
SSWD Water Resources Strategic Plan	SSWD	The Strategic Water Supply Plan for SSWD works with the regional plan and meets the long term water supply needs of its customers. The plan will provide a plan to maximize usage of treated surface water when available by supporting conjunctive use of water from the American River in normal and above normal precipitation years while protecting the River in below normal and dry years. The plan will provide the District with a tool that will enable a more efficient utilization of surface treated water that can provide more regional benefit to the ground water basin and create ground water banking opportunities.	Water Supply
Sunrise Douglas (Suncreek) Groundwater Treatment Plant	SCWA	The Sunrise Douglas Groundwater Treatment Plant is located at a point where the useable aquifer thickness begins to pinch out as the Sierra Nevada foothills raise up out of the alluvial deposits therefore only a small two to three well groundwater treatment plant is proposed in the southerly portion of the Sunrise Corridor/Mather/Sunrise Douglas Service areas. This facility will likely be capable of delivering up to 4,000 gpm and should be completed by 2010. There is also the possibility of routing raw water supplies from the Excelsior Road Well field to the Sunrise Douglas 2 WTP. This option will be investigated further as the Sunrise Douglas 2 development application proceeds.	Water Supply
Lower American River Task Force	SAFCA	The Task Force focuses on flood, environmental and recreational management issues affecting the lower reach of the American River from Folsom Dam to the Sacramento River. In 2002, Task Force participants cooperated in preparing the Lower American River Corridor Management Plan (RCMP) to provide a framework for integrated management of this reach of the river.	Ecosystem Restoration
Twin Oaks Avenue Groundwater Production Well	CHWD	The Twin Oaks Avenue Groundwater Storage and Recovery Project consists of a 1,000 gpm groundwater well near CHWD's northerly boundary with Roseville along the District's Twin Oaks Avenue Corridor between Sunrise Blvd and Auburn Blvd in Citrus Heights. Groundwater produced could be delivered into Roseville via the Roseville / Citrus Heights Interconnection Project. This new groundwater well will improve water supply reliability by contributing to interagency water exchanges and increasing the use of groundwater when appropriate to address emergencies, drought and environmental needs. Participants in this project include: CHWD, SJWD, FOWD, OVWC, Folsom, Cal Am and SGA.	Water Supply
Mayhew Drain Levee	SAFCA	The USACE Sacramento District is in the process of completing the slurry wall work on approximately 26 miles of levee along the American River. In 1996, Congress authorized the raising of levees along the American River in the Mayhew Drain area. Subsequently, the Water Resources Development Act of 1999 authorized the raising of the left bank of the levee upstream of the Mayhew Drain for a distance of 4,300 feet.	Stormwater & Flood Mgmt
Vineyard Surface Water Treatment Plant	SCWA	The Vineyard Surface Water Treatment Plant, located at Vineyard Rd and Florin Rd, is a 50 mgd plant that will service all of SCWA Zone 40. It will be the only surface water plant in the area, treating water coming off of the Freeport Regional Water Project.	Water Quality
Water Accounting Framework	SGA	The Water Accounting Framework will be used to track the volume of groundwater stored, changes in the volume of the groundwater stored, estimated volumes of basin losses and rejected recharge, the volume of groundwater recovered, and the volume of surface water forbearance. This framework will be used to evaluate future conjunctive use programs.	Water Supply
Water Forum Successor Effort	Water Forum Successor Effort	The WFA is an effort by business, agricultural leaders, citizens groups, environmentalists, water managers, and local governments to provide regional solutions to water shortages, environmental damage, groundwater contamination, and limited economic prosperity. The WFA provides the foundation for all regional planning.	Other
Water Purveyor Implementation of Best Management Practices (BMPs)	Water Forum Successor Effort, Water Purveyors	The Water Forum recommended an expanded list of conservation measures, including residential water metering for signatories to the WFA. Through discussions with various stakeholders and water agency representatives, the Water Forum developed a list of conservation measures, or BMPs, for adoption and implementation. The BMPs adopted by the Water Forum are a subset of those developed by the California Urban Water Conservation Council (CUWCC) and DWR. Individual agencies have been, and will continue to implement these BMPs as individual projects. The Water Forum anticipates full implementation of the BMPs by 2030.	Water Supply
Water Loss Reduction Project	EID	The Water Loss Reduction Project consists of the EID improving its distribution system such that water loss is reduced 2,000 AF/yr. The project consists primarily of advanced pressure management, decreased repair time and additional meter testing and replacement. Implementation includes repairing known leaks, increasing operational efficiency, automating the main water treatment facility to reduce reservoir overflows, and piping, lining, and removing irrigation ditches.	Water Supply
RWA Water Efficiency Program (WEP)	RWA	The WEP includes an array of measures aimed at improving water efficiency and meeting BMPs for urban conservation. A key feature of the WEP is its partnerships with water, wastewater, energy, storm water pollution and other resource management entities. The program provides water efficiency services to homeowners, gardeners, landscape managers, businesses and water utilities.	Water Supply
Laguna Ridge (Whitelock) Groundwater Treatment Plant	SCWA	The Whitelock Groundwater Treatment Plant is a 13 mgd plant that will treat water coming from 7 wells within a mile and a half of the treatment plant. The plant will be located at Whitelock Rd, east of Big Horn Boulevard and will service the Laguna Ridge Area.	Water Supply

Table 4.2 (continued) Descriptions of Projects and Programs in the ARB IRWMP

Projects and Programs	Responsible Agency(ies)	Description	Primary IRWMP Objective
North Delta Flood Control Studies	SAFCA	These studies include an assessment of the north Delta levees and flood control structures with the intent of increasing the strength of flood control measures. The studies focus on the Cosumnes and Mokelumne Rivers.	Stormwater & Flood Mgmt
PCWA Federal Energy Regulatory Commission Re-Licensing	PCWA	This includes the re-licensing of the project that was constructed by PCWA and brought into operation in 1967. It consists of a series of seven diversions and five powerhouses with a nameplate generating capacity of 223,750 kilowatts (KW). Water from the diversions is controlled and conveyed through four tunnels. At the end of the system, Project water is released to the Middle Fork American River approximately 29 miles upstream of Folsom Reservoir.	Water Supply
PCWA East Loomis Basin Project	PCWA	This project consists of a watershed planning study to identify problems, opportunities, constraints and objectives for increasing the water delivery efficiency of PCWA's East Loomis Basin canal system. Components of the efforts include performing hydrologic and hydraulic analyses through continuous stage and flow monitoring at twenty-five stations in the basin, evaluating environmental considerations through surveys of threatened and endangered species and wildlife habitats in the study area, stakeholder consensus building activities, and preparing draft and final planning reports and related technical appendices.	Water Supply
The Lower American River Habitat Management Plan	Water Forum Successor Effort	This plan is one of the seven elements of the WFA that will mitigate the impacts of the increased diversions from the LAR that are called for in the WFA. The plan is intended to fulfill one of the Water Forum's two coequal objectives – to preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. The HME will be implemented in through the Recreation Plan and the Fisheries and In-stream Habitat (FISH) Plan.	Ecosystem Restoration
EID Water Recycling Program	EID	This program was established in 2002. The plan describes the recycled water supply and demand and establishes an implementation plan to maximize the recycled water opportunities in the district.	Water Recycling
Aquifer Storage and Recovery (ASR) -- City of Roseville	City of Roseville	This project consists injecting treated drinking into the aquifer to store it for future use. Water is injected during winter months when there is excess flow and reduced demands on the aquifer. The stored water would be extracted only in summer months during dry years. Roseville plans to construct ten wells for injection and extraction purposes to help with conjunctive use practices.	Groundwater Management
Woodcreek West Aquifer Storage and Recovery Project	City of Roseville	This project consists injecting treated drinking into the aquifer to store it for future use. Water is injected during winter months when there is excess flow and reduced demands on the aquifer. The stored water would be extracted only in summer months during dry years. This project will start after testing of the Woodcreek North ASR project.	Water Supply
Mission Avenue Pipeline Interconnection - Sacramento Suburban	CWD	This project consists of an 18-inch interconnection with SSWD and 850 feet of pipeline improvements. CWD is faced with a growing groundwater contamination plume from Aerojet and this project will allow CWD to use groundwater from SSWD in the event that CWD groundwater supply becomes impacted by the groundwater contamination. By using another source of supply the migration of the plume may be slowed down giving Aerojet an opportunity for containment and remediation. If CWD is not able to construct the interconnection it may be required to increase the District surface water above the 12,000 AF agreed to in the WFA.	Water Supply
Cosumnes River Watershed Inventory and Assessment	Sloughhouse Resource Conservation District and Cosumnes River Task Force	This project consists of gathering information necessary to develop a long-range management plan for the Cosumnes River Watershed. The goals for the project are to inventory and characterize stream channel erosion by subwatershed, develop a map of unsurfaced roads in the entire watershed, estimate relative sediment yield by subwatershed and land-cover/land-use type, monitor and characterize sediment transport, assess watershed conditions and identify resource problems, prepare a watershed assessment report, and to develop an extensive community outreach program.	Ecosystem Restoration
Groundwater Monitoring Wells for Contaminant Plume Containment	CWD	This project consists of the installation of 4 monitoring wells, with locations to be determined. This project would allow CWD to track the migration of the plume discussed above and give the District time to plan for replacement water supplies in the event that Aerojet is unable to contain the migration of contaminate plume. The monitoring wells will also be used to monitor groundwater elevation for recharge and monitor over all groundwater quality within the basin. Information gathered from the monitoring wells will be submitted into the Data Management System for the SGA. This information will be used to address the regional concerns of over draft protection, groundwater quality, and contaminate plume tracking and notification.	Water Quality
PCWA/SSWD Pipeline Interconnection	PCWA	This project includes the construction of a 48-inch diameter waterline in Walerga Road from Antelope Road to Baseline Road and approximately 1900 feet of 36-inch diameter pipeline in Baseline Road west of Fiddymont Road. This pipeline would be used to deliver water diverted from Folsom Lake, treated at San Juan's Peterson Water Treatment Plant, conveyed west across northern Sacramento County through the Cooperative Transmission Pipeline that now ends near Antelope Road and Walerga Road, then north into Placer County where it will connect to existing pipelines near the intersection of Baseline Road and Fiddymont Road.	Water Supply
Sunset Industrial Area Groundwater Supply Improvements	PCWA	This project includes the rehabilitation of an existing well and construction of a new well within the Sunset Industrial Area of western Placer County. The existing well is located in the Sunset Industrial Area which was constructed to a depth of 200 feet in 1963, producing approximately 800 gpm. However, the well produces water with elevated levels of silica, presenting problems to industrial customers within the area. The project will install treatment facilities and upgrade related operational equipment to remedy this condition to meet customer needs. A new well at the Sunset Industrial Park is also proposed. The proposed new well is expected to produce 1,500 gpm or more. PCWA expects approximately 3,000 AF/yr of water supply benefit between the new well and the rehabilitated existing well.	Water Supply
East Elk Grove Groundwater Treatment Plant	SCWA	This project involves construction of a new groundwater treatment plant and equipping of two supply wells in the East Elk Grove area. The facilities include a pressure filter treatment system and a 3.5 MG water storage tank.	Water Supply
Indian River/Flaming Arrow Conjunctive Use Pipeline	SSWD	This project is a new pipeline to be constructed from Flaming Arrow Road to Auburn Blvd. aligned along Indian River Drive and Greenback Lane. This pipeline will be 20 inches in diameter and approximately 6,300 LF in length. This pipeline will improve hydraulic constraints in the transmission of surface water from the Cooperative Transmission Pipeline (CTP) into Sacramento Suburban's North service area. This project will facilitate the use and delivery of at least 5,000 AF/yr of surface water from the CTP, which periods in alignment with the WFA and regional conjunctive water management and groundwater management objectives.	Water Supply
Rio Linda/Elverta Groundwater Recharge Project	RLECWD	This project is to connect to the regional conjunctive use transmission main and extend the transmission main into RLECWD along with the drilling and equipping of two injection / extraction water wells. During wet years, SJWD will treat available American River water and deliver the water through SSWD's large diameter transmission main to the proposed transmission main to inject water into two proposed injection / extraction wells. This water will be banked during wet years and extracted during dry years from the propose wells.	Water Supply
SRCS D Water Recycling Betterment and Expansion Project (Phase II Project & Bartley Cavanaugh Golf Course)	SRCS D, City of Sacramento	This project will provide necessary facilities to treat and convey recycled water from the SRCS D site in Elk Grove to the Bartley Cavanaugh Golf Course. The project will provide for an average-day flow of 1.5 mgd and peak-day flow of 3.5 mgd. The proposed project includes a 2-mile long recycled water line from the SRCS D regional treatment facility to the Bartley Cavanaugh Golf Course, installation of microfiltration and disinfection treatment facilities, and upgrades of storage and distribution facilities at the public golf course to optimize recycled water use. The proposed project would reduce treated wastewater discharges to the Sacramento River. Furthermore, approximately 1.5 mgd of groundwater pumping in the over-drafted Central Groundwater Basin will be curtailed by converting the golf course from groundwater to recycled water use.	Water Recycling
Mayhew Floodplain Environmental Enhancement Project	SAFCA	This project will remove nonnative vegetation and establish native grasses and flowering herbaceous species in a degraded area of the American River Parkway. The Project will encompass approximately 5 acres along the south bank of the American River upstream of the Mayhew Drain. The project is the first of a series of improvements being planned for the project area.	Ecosystem Restoration
Mission Avenue Pipeline Interconnection - Citrus Heights	CWD	This proposed project relates to the replacement water supply needs described in Project 3. The proposed project includes installing 1,250 LF of 12-inch pipeline and related facilities to interconnect with CHWD on Mission Avenue. The interconnection will provide approximately 2,000 AF/yr of replacement water supply, in addition to the Bajamont WTP expansion. The proposed project will also improve system operations in the higher elevation portions of the Carmichael service area by connecting to the Citrus Heights system which operates at higher operating pressures, thus reducing the need for additional pumping and storage.	Water Supply
Sacramento County Stormwater Quality Program, 2003 Stormwater Quality Improvement Plan, & Activities	County of Sacramento	This Sacramento Stormwater Quality Improvement Plan (SQIP) describes the stormwater pollution prevention efforts to be implemented by the County of Sacramento and the Cities of Citrus Heights, Elk Grove, Folsom, and Galt. The mission of the Program is to implement a program that will comply with regulatory requirements to reduce stormwater pollution to the maximum extent practicable, and effectively eliminate illegal nonstormwater discharges, with an ultimate longterm goal of protecting the beneficial uses of local creeks and rivers.	Stormwater & Flood Mgmt
Urban Water Management Plans (UWMPs)	Water Purveyors	Urban Water Management Plans (UWMPs) are required to be completed every five years by water agencies with greater than 3,000 connections and/or delivery of over 3,000 AF for compliance with the Urban Water Management Planning Act. The Act requires urban water suppliers to prepare plans that describe and evaluate reasonable and practical efficient water uses, water recycling, and conservation activities.	Water Supply
Water Supply Master Plans	Water Purveyors	Water Supply Master Plans (WSMPs) are completed periodically by each water purveyor in the region for development and evaluation of alternatives to meet projected future water demands over a 20-25 year period. Information gathered and analyzed to develop and evaluate water supply alternatives includes projected water demands, water supply availability from a variety of sources, financial strategy, water quality constraints and regulations, and plans for implementation of projects recommended in the WSMP.	Water Supply
Zone 50 Infrastructure	SCWA	Water will be delivered to SCWA Zone 50 by a 30-inch transmission main connected to Sacramento's system. This transmission line then bifurcates with a 24-inch pipeline supplying Zone 50 and a 16-inch pipeline supplying Sacramento International Airport. By limiting flows at each of these facilities, adequate pressures can be maintained in Sacramento's system while the flow requirements of the agreement between Sacramento and Sacramento International Airport. This project will supply Zone 50 with 9.3 mgd of surface water in normal water years and 7 mgd of surface water and 2.3 mgd of groundwater in dry water years.	Water Supply
Steelhead Creek Wetland Improvement Project	SAFCA	Wetland 18A is a created wetland adjoining Steelhead Creek (formerly the Natomas East Main Drainage Canal) where it meets the American River Parkway. The site provides wetland functions and values, but during high river flow periods or flood events, water is often backed up into the wetland site. The backed up water carries juvenile Chinook salmon, steelhead and other species of concern, which are then isolated at the wetlands site by receding floodwaters. Once isolated, with no ability to return to main channels, non-native species prey heavily on the young fish which are essentially trapped. This project will re-configure the outlet of the wetland by excavating the outlet channel, constructing a concrete headwall, and placing a refurbished bridge across the outlet. These improvements will allow fish to leave the wetland area as river levels recede, greatly reducing the potential for isolation and predation.	Ecosystem Restoration
City of Folsom Sphere of Influence Water Supply Investigation	City of Folsom	Folsom is working closely with regional water purveyors to identify potential water supplies and assess conveyance options for a potential expansion of the city south of Highway 50 in accordance with City law and the Water Forum Agreement.	Water Supply
City of Folsom Water Management Strategy for Dry-year Reliability	City of Folsom	To ensure water supply reliability for its customers when diversions are reduced as agreed to under the Water Forum, Folsom is developing a comprehensive water management strategy that will integrate water demand management actions with temporary transfer and exchange arrangements with regional water purveyors.	Water Supply
Fairbairn Water Treatment Plant Intake Pump to serve Cal-Am/Rosemont and Parkway service areas	City of Sacramento	This feasibility investigation will ensure that the Fairbairn Water Treatment Plant intake pumps are large enough to supply water to serve the Cal Am/Rosemont and Parkway service areas.	Water Supply
SGA Measuring and Monitoring Program	SGA	In their Groundwater Management Program, SGA discussed their plan to expand the monitoring effort in their service area. To achieve this goal, there will be monitoring wells installed in strategic locations throughout the groundwater basin in the future.	Groundwater Management
City of Sacramento Transmission Main	SSWD	This transmission main would interconnect the existing Sacramento River Treatment Plant and the Fairbairn Water Treatment plant with provisions to connect the future treatment plant near Sacramento International Airport.	Water Supply
Environmental/Community Organization Interests and Activities	Various organizations	Some of the environmental and community organizations involved in the ARB through the Water Forum include: Environmental Council of Sacramento, Friends of the River, League of Women Voters, Sacramento Association of Realtors, Sacramento County Alliance of Neighborhoods, Sacramento County Farm Bureau, Sacramento County Taxpayers League, Sacramento-Sierra Building & Construction Trades Council, Save the American River Association, Inc., and Sierra Club-Mother Lode Chapter.	Ecosystem Restoration
PCWA Integrated Water Resources Plan	PCWA	PCWA made an assessment of its water supplies and future demand four years ago as documented in the March 2001 Surface Water Supply Discussion Paper. This IWRP updates the water supply and demand assessment done in 2001. The 2001 assessment assumed that groundwater and reclaimed water would not constitute any of the supply, instead relying only on surface water for supply. This assessment includes both groundwater and recycled water as part of the total available supply.	Water Supply
SRCS D Water Recycling Project (Phase I Project)	SRCS D, City of Sacramento	SRCS D operates Phase I of a water recycling program to deliver up to 2.7 mgd of recycled water to SCWA to meet non-potable water demands in the Laguna West Area.	Water Recycling
Placer County Stormwater Quality Program, Plan, and Activities	Placer County	The Placer County Stormwater Quality Program and Plan describe activities to reduce urban stormwater pollution and protect Placer County's creeks and rivers.	Stormwater & Flood Mgmt
City of Sacramento Stormwater Quality Improvement Program	City of Sacramento	The City of Sacramento Stormwater Quality Improve Program describes activities to reduce urban stormwater pollution and protect the City's creeks and rivers.	Stormwater & Flood Mgmt

Section 4
Integration of Water Management Strategies

Table 4.2 (continued) Descriptions of Projects and Programs in the ARB IRWMP

Projects and Programs	Responsible Agency(ies)	Description	Primary IRWMP Objective
City of Folsom Stormwater Quality Program and Activities	City of Folsom	The City of Folsom Stormwater Quality Program describes activities to reduce urban stormwater pollution and protect the City's creeks and rivers.	Stormwater & Flood Mgmt
City of Elk Grove Stormwater Quality Program and Activities	City of Elk Grove	The City of Elk Grove Stormwater Quality Program describes activities to reduce urban stormwater pollution and protect the City's creeks and rivers.	Stormwater & Flood Mgmt
City of Roseville Stormwater Management Program and Activities	City of Roseville	The City of Roseville Stormwater Management Program describes activities to reduce urban stormwater pollution and protect the City's creeks and rivers.	Stormwater & Flood Mgmt
Upgrade Water Main	City of Roseville	This project includes the rehabilitation of the water distribution system in older, more problem prone areas to ensure proper water flows for fire hydrants and to make loop systems. Water services will also be upgraded to prepare for street overlays in areas of frequent failure, and in areas identified by the meter retrofit program. This is an annual project, continually funded through Roseville's CIP.	Water Supply
Northridge Water Line	City of Roseville	This project includes the construction of approximately 12,000 linear feet of 24-inch and 36-inch water main along North Antelope Road, PFE Road, Cook Riolo Road and Booth Road to connect Roseville with the SSWD's distribution system.	Water Supply
Water System Security	City of Roseville	As a result of additional emphasis on security of water systems and new regulations requiring assessments, measures will need to be taken. This ongoing project allows for funding on certain measures identified that are required to maintain a secure utility as well as implement the physical security measures that may be required as a result of the Vulnerability Assessment completion.	Water Supply
West Side Tank and Pump Station Project	City of Roseville	This project will design and construct a 6 MG water storage tank, pump station, and chemical addition facility at the City's 5.1 acre site located in the West Roseville Specific Plan. The work will include site master planning to accommodate an eventual 10 MG of storage capacity, an intertie with the Sacramento River Diversion pipeline and satellite facility for water distribution operations. The tentative completion date is June 2008.	Water Supply
Water System Rehabilitation Program	City of Roseville	This project is the implementation of recommendations from the water system rehabilitation master plan effort. The project consists of pipeline construction projects identified in the condition assessment, with a tentative completion date of October 2007.	Water Supply
Pleasant Grove Wastewater Treatment Plant Expansion	City of Roseville	Treatment at the Pleasant Grove Wastewater Treatment Plant consists of screening, extended aeration, secondary clarification, filtering and disinfection. The water processed by the Pleasant Grove Wastewater Treatment Plant will be used to supply cooling water to the upcoming Roseville Energy Park and will be used for landscape and commercial irrigation in the West Roseville Specific Plan.	Water Recycling
City of Lincoln Regional Wastewater Treatment and Reclamation Facility Expansion	City of Lincoln	The project includes converting force mains to recycled water lines, extending and connecting existing recycled water lines from the City's regional wastewater treatment facility in southwest Lincoln to reclaimed water use locations. Current recycled water demands are estimated at 1,400 AF/yr in downtown Lincoln, specifically the Sierra Pacific Industries lumber mill and at local schools and public parks. Proposed recycled water pipelines are sized to accommodate additional future recycled water uses, and include related pumping facilities to manage system pressures for recycled water users. Connections to median landscapes and other uses are already plumbed with recycled water improvements (purple pipe) along the intended pipeline main distribution route.	Water Recycling
Sunrise Side-Channel Enhancement Project	Water Forum Successor Effort	The goal of this project is to lower the elevation of the entrance to the steelhead spawning channel and arm it so it is sustainable over a range of flows, up to about 35,000 cfs. This will increase steelhead spawning over a wider range of flows, and minimize mortality resulting from flow fluctuations. It will also provide Reclamation with greater operational flexibility, save cold water behind Folsom and conserve the use of b2 assets.	Ecosystem Restoration
Water Supply Strategy Sierra Vista and Creek View Specific Plans	City of Roseville	The City of Roseville is currently having studies done to help in identifying, negotiating and securing additional surface water supplies. The City is also evaluating the potential for further recycled water deliveries, while developing an overall water supply strategy for the Sierra Vista and Creek View Specific Plan areas.	Water Supply
Aquifer Storage and Recovery (ASR) Program -- SSWD	SSWD	SSWD currently has four existing wells with recharge capabilities. These wells were designed with separate injection pipelines installed along the outside of the well casings for future recharge. SSWD is planning to construct either one or two new wells and pump stations with the added recharge capabilities in the north service area. The project includes a new well and pump facility for recharge the first year, a possible second well site the following year and the study of the feasibility of groundwater recharge in this area of the basin.	Groundwater Management
SRCS D Water Recycling Program	SRCS D	SRCS D currently operates Phase I of a water recycling program to deliver up to 2.7 mgd of recycled water to SCWA to meet non-potable water demands in the Laguna West Area. The water recycling program is under expansion to serve recycled water to sites in Sacramento (Phase II), for a total production of 10 mgd. In addition, SRCS D is completing a WRMP to expand the program to 30-40 mgd through potential partnerships with multiple water purveyors in the region.	Water Recycling
SSCAWA Groundwater Management Plan	SSCAWA	In 2002, the Southeast Sacramento County Agricultural Water Authority (SSCAWA) developed and adopted a Groundwater Management Plan (GMP) to ensure that local groundwater resources are sustained and protected. This GMP is the SSCAWA's first step towards developing a formal and integrated approach to groundwater management. The GMP identifies management goals and data collection activities that will be undertaken by the SSCAWA in advancing its groundwater management plan.	Groundwater Management
Water Forum Agreement (WFA)	Water Forum	Begun in 1993, the Water Forum is a consensus-based, stakeholder process involving over forty representatives of the water purveyor, environmental, business, and public interest communities. The co-equal objectives of the Water Forum are to provide a reliable and safe water supply for the region's economic health and planned development through the year 2030 and to preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River. After six years, the Water Forum completed the Water Forum Agreement (WFA), which prescribed a regional conjunctive use program for Folsom Lake, the lower American River, and the connected groundwater basin.	Water Quality
ARB IRWMP Implementation	RWA, FRWA	Implementation of the ARB IRWMP includes implementation of its prioritized projects and programs as discussed in Section 6.	Water Supply

4.1.2. Groundwater Management

Groundwater management is one of the seven major elements of the WFA and one of the most important regional objectives of the IRWMP. The WFA developed a framework for how to properly allocate and manage groundwater in the ARB. Subsequent regional efforts have utilized that framework in their groundwater management processes. The SGA, SCWA, the Central Sacramento County (CSC), and the SSCAWA (in progress) GMPs were developed to ensure proper management of the Sacramento County portion of the ARB groundwater basin, while the Western Placer County Groundwater Management Plan (update underway) focuses on management of the Placer County portion of the ARB groundwater basin (groundwater is not generally available in El Dorado County). Each GMP has its own process for groundwater management, but all four GMPs seek the same goal: to ensure a viable groundwater resource for beneficial uses including agricultural, industrial, and municipal water users that support the WFA's co-equal objectives of providing a reliable and safe water supply and preserving the fishery, wildlife, recreational, and aesthetic values of the lower American River. Of particular note, the CSC GMP partakes in the enhancement of maintaining ecological flows in the Cosumnes River. In order to meet these goals, the participants have adopted five basin management objectives (BMO) which include:

1. Maintain or improve groundwater quality in the ARB for the benefit of basin groundwater users.
2. Maintain groundwater elevations that result in a net benefit to basin groundwater users.
3. Protect against any potential inelastic land surface subsidence
4. Protect against adverse impacts to surface water flows in the American, Cosumnes, and Sacramento Rivers.
5. Protect against adverse impacts to water quality resulting from interaction between groundwater in the basin and surface water flows in the American and Sacramento River.

4.1.2.1. Maintain or Improve Groundwater Quality in the ARB for the Benefit of Basin Groundwater Users

This strategy involves utilizing non-contaminated groundwater sources within the ARB groundwater basin, and collaborating efforts with appropriate state and federal regulatory agencies and other interested parties to contain and remediate contaminated groundwater sources within the ARB.

4.1.2.2. Maintain Groundwater Elevations that Result in a Net Benefit to Basin Groundwater Users

This strategy implements a conjunctive use program that attempts to stabilize and/or improve existing cones of depression within the ARB.

4.1.2.3. Protect Against Any Potential Inelastic Land Surface Subsidence

This strategy is to monitor for potential land surface subsidence in conjunction with declining groundwater levels within the ARB. If land subsidence is identified and associated with declining groundwater levels, the ARB will take appropriate action to avoid adverse impacts.

4.1.2.4. Protect Against Adverse Impacts to Surface Water Flows in the American, Cosumnes, and Sacramento Rivers

This strategy intends to protect and enhance the lower American, Cosumnes and Sacramento Rivers, and monitor and evaluate the relationship between groundwater pumping and any adverse impacts on adjacent rivers and streams.

4.1.2.5. Protect Against Adverse Impacts to Water Quality Resulting from Interaction between Groundwater in the Basin and Surface Water Flows in the American and Sacramento Rivers

This strategy intends to understand the affects between discharged groundwater to surface water channels, and provide evidence that controllable operations of groundwater systems do not negatively impact the water quality of Sacramento County rivers and streams.

Increased growth within the ARB places a direct need to rehabilitate, improve, and expand the ARB's water delivery infrastructure. Historically, groundwater wells, both public and private, have had minimal accountability regarding construction, operations, and use. The ARB, in an attempt to better monitor groundwater pumping, is proposing the use of a Standard Operating Procedures (SOP) for collecting water level data by each of the cooperating agencies and incorporating this information into the existing Data Management System (DMS). The SOP will improve the comparability, reliability and accuracy of groundwater data collected. Participating agencies will initiate the collection of water quality data imposed by DHS for the collection, pretreatment, storage, and transportation of water samples, and provide SOP training.

The Data Management System (DMS) database will be upgraded to house all the groundwater data and well information collected. The DMS will make accessible:

- Well construction details.
- Known locations of groundwater contamination and potentially contaminating activities.

- Long-term monitoring data on:
 - Monthly extraction volumes.
 - Water elevations.
 - Water Quality.
- Aquifer characteristics based on well completion reports.

Table 4.1 demonstrates how groundwater management integrates with other water management strategies to ensure that one regional objective can be achieved without neglecting another regional objective.

4.1.3. NPS Pollution Control and Water Quality Protection and Improvements

As the population within the ARB continues to increase, the demand for high quality drinking water continues to be of significant concern. In the past, the focus has been to understand the water quality issues pertaining to major ground and surface water quality problems impacted by specific point source discharges. Major regulatory programs were developed to address these water quality concerns and to control discharges to surface waters from wastewater treatment plants, industries, landfills and other specific sources. The recent focus described in the Watershed Management Initiative 2002 is to identify, understand, and address non-point sources such as agriculture, silviculture, urban runoff, past mining activities, dairies, and individual wastewater disposal systems. These non-point source discharges have been identified as particular problems associated with surface and ground water quality. Generally, the most significant non-point source discharges are listed in **Table 4.3**.

Table 4.3 Non-Point Source Discharges and Pollutants

Non-Point Sources	Discharge Pollutants
Agricultural Surface Water Discharge	Salt, selenium, other nutrients
Stormwater discharges	Pesticides, pathogens, sediments, metals
Septic tank discharges into groundwater	Nitrates, salts
Past mining activity	Mercury discharges to streams

Over the past 45 years, state and local government, often under federal regulations, have developed legislative acts and laws, prevention programs, and regulating plans have been implemented that focus on satisfying both local and regional short and long term water quality objectives. **Table 4.4** lists several key federal, state, and local efforts to meet drinking water regulations.

As there are many other regulatory rules and programs, the implementation of these has provided the agencies in the region an avenue to continue monitoring and regulating water sources so as to provide high water quality. As the ARB continues to grow, a number of projects, programs, or plans, either

Section 4
Integration of Water Management Strategies

existing or proposed, will likely have a project component that will benefit water quality. Furthermore, additional SDWA requirements have caused the EPA to establish new regulations. **Table 4.5** lists three proposed EPA regulatory efforts.

The ARB strives to develop and improve upon their water quality efforts to ensure a reliable, high quality water supply. The ARB water quality efforts and practices coordinate closely with the guidelines set forth by the State and Federal agencies, and are proving beneficial in achieving 2030 water quality objectives.

Table 4.4 Federal, State, and Local Efforts to Meet Drinking Water Regulations

Regulations and Programs	Description
Federal	
Porter-Cologne Water Quality Control Act, 1969	Established the functions of the State Board regarding water quality control, encouraged state planning, and incorporated additional water quality considerations into the procedure governing the acquisition of water rights permits.
Clean Water Act, 1972	Requires states prepare water quality standards and submit them to the Environmental Protection Agency (EPA) for approval.
Clean Water Act, Section 401 Water Quality Certification	Any applicant for a Federal license or permit to conduct any activity including the construction or operation of facilities, which may result in any discharge into the navigable waters. Any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this Act.
Clean Water Act, Section 402	Prohibits the discharge of a pollutant from a point source without a permit.
Clean Water Act, Section 404	Limits the discharge of dredged or fill material into waters of the U.S.
Clean Water Act, Section 208	Requires water pollution from non-point sources to be managed through area-wide waste treatment management plans.
Clean Water Act, Section 319	Non-point Source Management Program provides federal assistance to State, Territories, and Indian Tribes through grant money, which supports a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific non-point source implementation projects.
Clean Water Act, Section 303d	Requires development of a list of regional water bodies that are not expected to meet water quality standards, and development of a program establishing total maximum daily loads of those pollutants to ensure that receiving water beneficial uses are maintained.
Clean Water Act, Section 305b	USEPA report describing the status of the water quality in the State.
Safe Drinking Water Act (SDWA)	Maximum allowable drinking water contaminant levels set by the EPA. The MCL is a level at which no adverse human health risks are expected.

Table 4.4 (continued) Federal, State, and Local Efforts to Meet Drinking Water Regulations

Regulations and Programs	Description
State and Local	
Total Maximum Daily Loads (TMDLs)	A federal requirement that is administered by the state. TMDLs are defined as a sum of the individual waste load allocations (WLA) for point sources of pollution, plus the load allocations (LAs) for non-point sources of pollution, plus the contribution from background sources of pollution. It can be expressed in terms of either mass per time, toxicity, concentration, a specific chemical, or other appropriate measure.
National Pollutant Discharge Elimination System (NPDES)	Federal program, which has been delegated to the State of California for implementation. NPDES permits, also referred to as Waste Discharge Requirements, are issued to regulate the discharge of municipal wastewater or industrial process, cleaning, or cooling, wastewaters, commercial wastewater, treated groundwater from cleanup projects, or other wastes to surface waters only.
Grant Project Priorities	Regional Board provides technical assistance and directing grant funds in support of water quality improvement projects that meet Board approval, but are outside their jurisdiction.
Monitoring and Assessment	Critical for evaluating whether beneficial uses are being protected and for evaluating the success or failure of the program. The monitoring efforts provide a follow up on water quality problems listed in the 303d listing, and initiate programs to assess water bodies that have not been evaluated.
Non-point Source Program	Improve the State's effort to protect water quality, and to conform to the Clean Water Act 319 and Section 6217 of the Coastal Zone Act Reauthorization Amendments.
Basin Planning	Establishes the framework that implements state and federal water quality control laws and regulations within each regional board. The plans include a list of beneficial water uses within the Region, water quality objectives to protect these uses and a program of implementation needed to achieve the objectives and protect the beneficial uses.
Water Quality Certification	In accordance to USCOE 404 and Section 401 CWA, the program protects water quality from dredge and fill activities in waterways and wetlands ensuring that there is no net loss of wetlands within the State.
Waste Discharge Requirements Program	The program consists of issuing WDRs for new facilities, updating and revising existing WDRs, conducting announced and unannounced compliance inspections, responding to complaints, reviewing self monitoring reports, technical reports and taking various levels of enforcement action and responding to appeals of Board actions.

Table 4.5 Proposed EPA Regulations for Satisfying the Safe Drinking Water Act

Proposed Regulation	Regulation Description
Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)	Intended to improve control of microbial pathogens, including specifically the protozoan <i>Cryptosporidium</i> common within drinking water, and to address risk trade-offs with disinfection byproducts
Radon Standards: Multimedia framework options (2)	State can choose develop enhanced state programs to address the health risks from radon in indoor air – Multimedia Mitigation (MMM) programs – while individual water systems reduce radon levels in drinking water to 4,000 pico curies per liter (pCi/L) or lower. If a state chooses not develop an MMM program, individual water systems in that state would be required to either reduce radon in their system’s drinking water to 300 pCi/L or develop individual local MMM programs and reduce levels in drinking water to 4,000 pCi/L.
Potential Contaminants for Future Regulation	EPA is required, under SDWA, to establish standards for 25 additional contaminants every three years

4.1.4. Environmental and Habitat Protection and Improvement, Ecosystem Restoration and Wetlands Enhancement and Creation

There are many projects and activities at various stages of development or planned to benefit the environmental resources of the lower American River, Sacramento River, and Cosumnes River. Strategies for environmental and habitat protection and improvement have been identified with careful consideration of the planning efforts performed by stakeholders. Two of the major regional strategies identified are:

- Recommended actions in the areas of fisheries and in-stream habitat, vegetation and wildlife management such as maintaining in-stream flows and suitable year-round stream temperatures.
- To preserve and enhance the regions ecosystems such as vernal pool, non-vernal pool wetland, riparian, oak woodland, grassland and agricultural habitats.

Some of the regional efforts identified that support these regional strategies include the following:

4.1.4.1. MOA for the Management of Water and Environmental Resources Associated with the Lower Cosumnes River

The MOA between SCWA, TNC, and SSCAWA was initiated to develop an agreement for management of Cosumnes River water resources. Working through the Water Forum, the MOA was developed by the SCWA, TNC and the SSCAWA. The agreement requires SCWA, TNC and SSCAWA to determine the viability of enhancing flows and preserving riparian habitat within the Cosumnes River corridor through the implementation of a surface water-groundwater recharge program. The Water Forum facilitated the discussions among the parties, resulting in the MOA agreement. The MOA reflects the collective desires

of these parties to work cooperatively to sustain and restore the resources of the Cosumnes River corridor through the appropriate management of water in the corridor. The MOA was developed to determine the viability of, preserve the opportunity for, and participate in the implementation of a surface water-groundwater recharge program while enhancing flows and preserving riparian habitat within the Cosumnes River corridor. The MOA's water resources objectives are to:

- Sustain groundwater resources.
- Investigate and preserve the opportunities for a groundwater recharge program.
- Develop project elements with the IRWMP an integrated regional water management plan that protects and enhances the existing environment.

4.1.4.2. Cosumnes River Fish Passage Project

The Fishery Foundation of California constructed a fish ladder at Granlees Dam at Rancho Murrieta on the lower Cosumnes River to improve adult salmon passage at the dam. A culvert was also constructed at a weir that impeded migration on the lower river. The Foundation has worked with the local irrigation district, the Rancho Murrieta Development, CDFG, the CALFED Program, and the Anadromous Fish Restoration Program in developing and implementing the project. Further projects on the river are needed to improve passage. Actions may involve physical changes to the river (e.g., fish ladders) or even augmented stream flows (Fishery Foundation of California 2005).

4.1.4.3. Cosumnes River Preserve Management Plan

The Cosumnes River retains much of the dynamic river process, broad ecological diversity, and intense natural productivity that was typical of Central Valley river environments prior to European settlement. Because of these attributes, the Cosumnes River corridor presents a unique, globally significant opportunity for wildlife habitat preservation and restoration, and for cost effective floodplain management policies. The goals of the project are to:

- Protect critical natural habitats in the Cosumnes River watershed through acquisition of fee ownership and conservation easements.
- Secure habitat for imperiled species such as the Sandhill Crane, Giant Garter Snake, Swainson Hawk, anadromous and resident fish, and wintering waterfowl.
- Restore natural hydrologic processes to the Cosumnes River floodplain and wetlands.
- Provide opportunities for compatible and economically productive agricultural uses.

Section 4
Integration of Water Management Strategies

The Cosumnes River Preserve is a habitat protection, restoration and preservation project dedicated to habitats within the Cosumnes River watershed. The project's participants acquire, restore and maintain property for the purpose preserving diminishing habitats in California's Central Valley. The Cosumnes River, located 15 miles south of Sacramento, is a unique natural resource as it is the largest free-flowing river in the Central Valley of California. The watershed encompasses a rich array of natural communities, including wetlands, riparian forests, and vernal pool grasslands. The Cosumnes River Preserve is a cooperative project engaging a coalition of public and private partners, including the Bureau of Land Management, The Nature Conservancy, California Department of Fish and Game, Ducks Unlimited, California Department of Water Resources, Sacramento County, Sacramento Valley Open Space, Garcia Living Farms, Environmental Protection Agency and Bureau of Reclamation. To date over 12,000 acres have been protected at a cost of \$29 million (UC Davis 2005).

4.1.4.4. Cosumnes River Flow Augmentation Project

The Cosumnes River Flow Augmentation Project will provide supplemental water to the Cosumnes River that will provide for local groundwater recharge and fish passage improvements for fall-run chinook salmon. The project is a specific element of the Cosumnes River MOA between TNC and SCWA. SCWA will provide up to 5,000 acre-feet of water annually through the Folsom South Canal to an existing turnout to the Cosumnes River. The SSCAWA will manage releases into the Cosumnes River to pre-wet the river channel prior to the onset of natural fall flows in the lower reaches of the river. The Project will provide information regarding the effectiveness of releasing supplemental water into the Cosumnes River for groundwater recharge and for the restoration of historical fall flow patterns critical for successful salmon migration. The project timeline is from 2005 through 2010.

4.1.4.5. Initial Fisheries and In-stream Habitat Management and Restoration Plan for the Lower American River

The flow and temperature considerations report provided the foundation for identifying and prioritizing opportunities for restoration in the lower American River. The Baseline Report established that flow and water temperature improvements have the greatest potential for restoration with respect to the priority fish species of the FISH Plan. As a result, the most immediate opportunities that exist for fish habitat improvement involve hydrologic system operations and management actions. Managing the timing, temperature, and rate of flow released from Folsom and Nimbus dams is likely to produce the most immediate and effective results for fish restoration. Opportunities for physical fish restoration actions also exist within the hydrologic and regulatory constraints inherent in managing the American River Basin water supply (Water Forum 2001).

The Initial Fisheries and In-stream Habitat Management and Restoration Plan for the Lower American River (FISH Plan) articulates a broadly-shared understanding regarding the management and restoration actions that are most important to undertake to improve conditions for priority fish species in the lower American River (LAR). It constitutes a single blueprint for enhancement of lower American River fisheries and in-stream habitat. The FISH Plan was developed by the Fisheries and Instream Habitat (FISH) Working Group (FWG) of the Lower American River Task Force, and approved in October 2001. (See pages 1-1 and 1-2 for a list of FWG member organizations.)

This FISH Plan serves as the aquatic habitat management element (HME) of a multi-agency River Corridor Management Plan (RCMP) that was funded by CalFed in January 2000. It also is intended to serve as the Habitat Management Plan (HMP) for the lower American River, as required under the Sacramento Area Water Forum Agreement, consistent with the mitigation described and certified in the Water Forum Agreement Environmental Impact Report (EIR) and adopted Mitigation, Monitoring, and Reporting Plan (MMRP). Significantly, the FISH Plan provides a local-stakeholder established framework for CalFed Ecosystem Restoration Program Plan implementation.

The goals of the FISH Plan are to:

- Increase and maintain viable populations of naturally spawning fall-run chinook salmon.
- Achieve and maintain a viable population of splittail.
- Restore or maintain an appropriate distribution and abundance of other native fish.
- Maintain American shad and striped bass populations of sufficient abundance to sustain these fisheries, consistent with restoring native species.

4.1.4.6. River Corridor Management Plan (RCMP)

The RCMP was developed by the Lower American River Task Force with representatives from more than 40 local, state, federal, community, environmental, flood control and neighborhood agencies/organizations endorsed the RCMP as the basis for continued multi-agency resource management of the lower American River. The RCMP includes goals, objectives, and recommended actions in the areas of fisheries and in-stream habitat, vegetation and wildlife management, flood management, and recreation. One element of the River Corridor Management Plan is the Fisheries and In-Stream Habitat Management and Restoration Plan for the Lower American River (FISH Plan).

Section 4
Integration of Water Management Strategies

Development of the RCMP has been an excellent example of true regional collaboration, involving the active and sustained participation of federal, state, regional and local agencies, as well as a variety of community groups such as neighborhood associations, environmental groups, and business partnerships. (Lower American River Task Force 2003).

4.1.4.7. The Lower American River Habitat Management Plan

The Lower American River Habitat Management Plan will include priorities, schedules and budgets for projects that will benefit the Lower American River fishery, riparian, and recreational resources. This plan will help guide activities of the Water Forum Successor Effort and be prepared in cooperation with multiple agencies.

4.1.4.8. The South Sacramento Habitat Conservation Plan

SSHCP is a regional approach to addressing issues related to urban development, habitat conservation and agricultural protection. The SSHCP will consolidate environmental efforts to protect and enhance wetlands (primarily vernal pools) and upland habitats to provide ecologically viable conservation areas. It will also minimize regulatory hurdles and streamline the permitting process for projects that engage in development activities. The SSHCP will cover 46 different species of plants and wildlife including 11 that are state or federally listed as threatened or endangered. The SSHCP will be an agreement between state/federal wildlife and wetland regulators and the Sacramento County which will allow land owners to engage in the “incidental take” of listed species (i.e., to alter or degrade habitat in connection with economic activity) in return for conservation commitments from the County. These commitments will be identified prior to adoption of the SSHCP and will be fulfilled using funds from a per-acre fee paid by developers to mitigate habitat impacts from new development. These fees will be directed to both public and private mitigation sites that provide large-scale habitat preservation and limited habitat restoration opportunities. The geographic scope of the SSHCP includes the unincorporated Sacramento County area bounded by Highway 50 to the north, the County line to the east and south; excluding the Delta, and Interstate 5 to the west. Sacramento County is seeking to partner with the incorporated cities of Elk Grove, Rancho Cordova and Galt to further advance the regional planning goals of the SSHCP (Sacramento County 2005).

Goals and objectives to develop the Habitat Conservation Plan include a process that:

- Involves all stakeholders in the study area including developers, environmentalists, agriculturists, and government agencies.
- Educates stakeholders regarding the importance of the plan, its components, and its significance to them.
- Progresses in an efficient and expeditious manner through consensus building.
- Stakeholder goals are to create a Habitat Conservation Plan that:
 - Ensures long-term viability to aid and enhance recovery of sensitive species in the study area by protecting an adequate quality and quantity of habitat in an integrated manner.
 - Accommodates development in appropriate sites with fair and reasonable mitigation cost structure.
 - Protects agricultural lands and operations from constraints associated with the plan's implementation.
 - Gains the trust of all stakeholders in the permitting process by providing certainty that their interests will be considered in a fair and predictable process.
 - Relies on voluntary participation through incentives that make the HCP process preferable to the existing process.
 - Provides a streamlined permitting process that reduces permitting cost to developers and taxpayers.
 - Provides a comprehensive framework for use in linking plant and animal conservation with local land use programs, consistent with Sacramento County General Plan goals and policies.

The South Sacramento Habitat Conservation Plan has identified 11 federally and state listed threatened and endangered species and an additional 35 species of special concern. The SSHCP will identify and implement conservation strategies for each of these species, to prevent further population declines, help to aid in the recovery of listed species and help avoid future listing of the species of special concern.

A main goal of the conservation strategy is to preserve and enhance large tracts of land and intact watersheds to provide broad landscape protection that will sustain and eventually enhance the regions ecosystems. The strategy will address various habitat types such as vernal pool, non-vernal pool wetland, riparian, oak woodland, grassland and agricultural habitats. Development of this strategy will include sound principles of reserve design such as the preservation of large, intact preserves within close proximity to one another that will capture species populations across their range. Where it is not possible to protect large preserves, corridors will be used to maintain connectivity between core preserve areas allowing for immigration and migration of species, which is critical in promoting and maintaining a healthy, biologically functioning ecosystem. The strategy will strive to incorporate diverse physical and environmental conditions while maintaining contiguous blocks of habitat to prevent fragmentation and reduce edge disturbances caused by urban encroachment.

Most of the conservation will occur outside of the Sacramento County Urban Service Boundary. However, there will be protection of unique and valuable habitat inside the County's Urban Service Boundary.

4.1.4.9. Natomas Habitat Conservation Plan and Placer County Habitat Conservation Plan

Two other HCPs in the region are the Natomas HCP and Placer County HCP. A non-Federal entity develops an HCP in order to apply for an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act. The HCP integrates the applicant's proposed project or activity with the needs of the species. It describes, among other things, the anticipated effect of a proposed taking on the affected species and how that take will be minimized and mitigated. Such information must be submitted with any incidental take permit application.

4.1.4.10. Central Valley Project Improvement Act

The Central Valley Project Improvement Act (CVPIA) (Title 34 of P.L. 102-575) amends the authorization of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes of the CVP having equal priority with irrigation and domestic uses of CVP water. It also elevates fish and wildlife enhancement to a level having equal purpose with power generation.

The CVPIA identifies several measures to meet these new purposes. Significant among these is the broad goal of restoring natural populations of anadromous fish (i.e., chinook salmon, steelhead, green and white sturgeon, American shad, and striped bass) in Central Valley rivers and streams to double their recent average levels. A key element of the program is instream flow recommendations, including objectives for the Lower American River, upper Sacramento River, and the Delta.

The Secretary of the Interior also is directed under section 3406(b)(2) of Title 34 (P.L. 102-575) to dedicate and manage annually 800,000 AF of CVP yield for the primary purpose of implementing the fish, wildlife, and habitat restoration and measures authorized by that title.

Under the CVPIA, the Department of the Interior is responsible for carrying out two programs that provide significant assurances that fishery, wildlife, recreational, and aesthetic values of the Lower American River will be protected. These programs are the Anadromous Fish Restoration Program (AFRP) and the habitat improvements financed through the CVPIA Restoration Fund.

4.1.4.11. Ecosystem Restoration Program Plan of the CALFED Bay-Delta Program

The mission of the CALFED Bay-Delta Program is to develop a long-term comprehensive plan that will restore ecosystem health and improve water management for beneficial uses of the Bay-Delta system. The Program addresses problems in four resource areas: ecosystem quality; water quality; system integrity; and water supply reliability.

The goal for ecosystem quality is to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species. The CALFED Ecosystem Restoration Program Plan (ERPP) addresses this goal. The foundation of the Program is restoration of ecological processes that are associated with streamflow, stream channels, watersheds, and floodplains. These processes create and maintain habitats essential to the life history of species dependent on the Delta. In addition, the Program aims to reduce the effects of stressors that inhibit ecological processes, habitats, and species. Key restoration actions for Sacramento River fisheries being proposed by this Program include the following:

- Enhancing river flows.
- Restoring the natural river meander process.
- Enhancing riparian and riverine habitats.
- Maintaining suitable river temperatures for salmonids.
- Reducing fish losses at points of water diversion.
- Improving anadromous fish passage at existing barriers.
- Maintaining and improving water quality.
- Improving hatchery and stocking programs.
- Improving management of inland harvest of salmonids.

Such restoration actions, when implemented over the next few decades, are expected to improve Sacramento River fisheries, including salmonid fisheries, over existing conditions. The ERPP establishes similar restoration goals for other major water courses throughout the Central Valley.

4.1.4.12. Restoring Central Valley Streams: A Plan for Action

In 1993, CDFG published its Restoring Central Valley Streams: A Plan for Action, which was developed to address the protection of anadromous fish habitat in Central Valley streams (CDFG 1993b). This plan identified five priorities for the Lower American River, and establishes them as recommendations. They are:

- Maintain instream flow releases below Nimbus Dam.
- Establish minimum fall carryover storage at Folsom Reservoir to maintain suitable year-round stream temperatures.
- Control rapid flow fluctuations to protect eggs and fry of anadromous fish.

Section 4
Integration of Water Management Strategies

- Develop a coordinated multi-agency management plan.
- Develop and implement a continuing program for the purpose of restoring and replenishing, as needed, spawning gravel lost due to the construction and operation of the CVP dams, bank protection projects, and other actions that have reduced the availability of spawning gravel and rearing habitat in the Lower American River.

4.1.4.13. Steelhead Restoration Plan for the American River

In 1991, CDFG published its *Steelhead Restoration Plan for the American River*. The Plan has two main objectives (CDFG 1991):

- Restoring and maintaining naturally produced steelhead as an integral component of the American River ecosystem.
- Restoring the population to a level which will sustain a quality steelhead fishery and provide for other non-consumptive uses.

The plan focuses on restoring habitat conditions within the American River, and on supplementing the existing fisheries population with artificially reared fish. The plan also recommends that the overall CVP operations be adjusted to allow for the elimination of drastic flow fluctuations in the American River. To minimize the dewatering of redds, the plan recommends that flows during the incubation period (March through May) be no less than flows during the spawning period (December through February). The plan also states that water temperatures should be no greater than 52EF during spawning, incubation, and emergence (December through May) and no greater than 60EF during fry and juvenile rearing (June through November). In addition, a minimum coldwater pool should be maintained in Folsom Reservoir from June through October.

4.1.4.14. NMFS Biological Opinion for Winter-Run Chinook Salmon

On February 12, 1993, the NMFS issued a long-term Biological Opinion regarding the operational impacts of the CVP on winter-run chinook salmon (NMFS 1993). Based on Reclamation's Long-Term Central Valley Project Operations Criteria and Plan (CVP-OCAP) and biological assessment of impacts, the Biological Opinion concluded that the proposed long-term operations of the CVP and SWP would likely jeopardize the continued existence of winter-run chinook salmon and identified Reasonable and Prudent Alternatives to avoid jeopardy. NMFS agreed to reinitiate immediate re-consultation on the Biological Opinion when the Principles for Agreement for the Bay-Delta Plan (i.e., Bay-Delta Water Quality Control Plan) were originally signed on December 15, 1994.

4.1.4.15. USFWS Biological Opinion for Delta Smelt

With the signing of the Principles for Agreement for the Bay-Delta Plan, the USFWS agreed to initiate immediate re-consultation on the Biological Opinion it had issued on February 4, 1994, which addressed the effects of the combined operations of the CVP and SWP on delta smelt for the period February 15, 1994, through February 15, 1995. In that opinion, the USFWS had concluded that the proposed operations of the CVP and SWP would result in jeopardy; therefore, Reasonable and Prudent Alternatives (RPA) were included in the Biological Opinion consisting of specific operational criteria that the CVP and SWP would implement (USFWS 1994, 1995).

On March 6, 1995, the USFWS issued a revised Biological Opinion for delta smelt. This opinion states that the proposed long-term combined CVP and SWP operations, as modified by the Biological Opinion for winter-run chinook salmon, the Principles for Agreement, and the Bay-Delta Plan (draft at the time) are not likely to jeopardize the continued existence of the threatened delta smelt or adversely modify its critical habitat. The opinion identifies the water quality standards along with the operational constraints that are to provide benefits to delta smelt.

4.1.4.16. Water Forum Agreement

The Water Forum Agreement outlines agreed-to diversions for each water supplier and the facilities needed to divert, treat, and distribute the water. The Water Forum Agreement includes alternative ways for purveyors to reduce surface water diversions from the American River. Increased surface water diversions and new diversion facilities anticipated at 2030 with or without the Water Forum Proposal could have both direct and indirect effects on fisheries resources and aquatic habitats within multiple water bodies of the region. The WFP EIR identified the direct-effect study area for the Water Forum Proposal as Folsom Reservoir, Lake Natoma, and the Lower American River and the indirect-effects study area included Shasta and Trinity reservoirs, the upper and lower Sacramento River, and the Sacramento-San Joaquin Delta.

4.1.4.17. Shaded Riverine Aquatic Habitat at RM 2.4L

In 2003, the Corps worked with local, state, and federal agencies to develop a project that established approximately 650 linear feet of shaded riverine aquatic habitat at RM 2.4L. The habitat is now under active maintenance by a landscaping contractor and this site will be monitored for 10-15 years after planting.

4.1.4.18. Folsom Dam and Reservoir Operations

The US Army Corps of Engineers and US Bureau of Reclamation are studying potential physical improvements and operational modifications of the Folsom Dam and Reservoir. These improvements aim to preserve cold water, especially during late summer and fall conditions, while providing additional storage release flexibility during flooding periods. Improvements are intended to minimize the impact of flow fluctuations in the lower American River.

4.1.4.19. Discovery Park Floodplain Habitat Enhancement

A floodplain habitat enhancement project in Discovery Park was constructed between November 2001 and January 2002, converting steep shoreline into a graded contoured segment of planted bank. The site is designed to seasonally flood with features that will develop into a successful riparian habitat to support wildlife, control erosion, and serve as floodplain habitat for Sacramento splittail and refuge/habitat for out-migrating salmon.

4.1.5. Conjunctive Use

Conjunctive use is known as the combined use of groundwater and surface water to meet regional water demand. Conjunctive use improves overall water supply reliability while at the same time providing for sustainable use of groundwater in a way that does not require restrictions on groundwater pumping and sustainable use of surface water to minimize impacts on riparian and aquatic habitats.

The benefit of conjunctive use is the ability to maintain a sustainable use of groundwater with combined surface water supplies to meet regional demand. Given the hydrology of the region, separate estimated average annual sustainable yields of 131,000 acre-feet for the North Area, 273,000 acre-feet for the South (Central Basin) Area and 115,000 acre-feet for the Galt Area have been formulated by the Water Forum. The goal of conjunctive use is to pump the sustainable yield or less while supplementing the remaining water demand with surface or recycled water.

In an effort to determine how much surface water can be used by the various water purveyors, the Water Forum defined the differences between a driest year, a drier year, and a wet/average year. The years are defined by how much runoff is collected in Folsom Reservoir as follows:

Wet/Average Year: Depending on the agency, years when the projected March through November Unimpaired Inflow to Folsom Reservoir is greater than 950,000 acre-feet or 1,600,000 acre-feet or greater.

Drier Year: Depending on the agency, years when the projected March through November Unimpaired Inflow to Folsom Reservoir is less than 950,000 acre-feet or 1,600,000 acre-feet or less.

Driest Year: Years when the projected March through November Unimpaired Inflow to Folsom Reservoir is less than 400,000 acre-feet.

Water purveyors have entered into contracts with each other to optimize surface water use in wetter years from areas that are not using their allotted surface water supplies to jurisdictions that are/were solely reliant on groundwater. Consequently, the groundwater aquifers will have a chance to naturally recharge in the wetter years. As shown in **Table 4.1**, many of the projects within the region have conjunctive use components. **Table 4.1** also demonstrates how conjunctive use integrates with other water management strategies to ensure that multiple regional objectives can be met without neglecting other regional objectives.

4.1.6. Stormwater Management

Stormwater runoff is one of the most significant sources of water pollution in the nation, at times “comparable to, if not greater than, contamination from industrial and sewage sources.” (Lee and Cameron 1992). Stormwater runoff carry carries suspended metals, sediments, algae-promoting nutrients (nitrogen and phosphorus), floatable trash, used motor oil, raw sewage, pesticides, and other toxic contaminants into streams, rivers, lakes, and estuaries across the United States (US EPA 1999). In 1985, three-quarters of the states cited urban stormwater runoff as a major cause of waterbody impairment, and forty percent reported construction site runoff as a major cause of impairment. Urban runoff has been named as the foremost cause of impairment of surveyed ocean waters. Among the sources of stormwater contamination are urban development, industrial facilities, construction sites, and illicit discharges and connections to storm sewer systems (US EPA 1999).

Stormwater runoff occurs everywhere, on urban terrains, irrigated lands, etc. and therefore regulators have seen fit to regulate varying stormwater discharges in an attempt to protect the nations and California’s water quality. The federal Clean Water Act (CWA) has nationally regulated the discharge of pollutants to waters of the United States from any point source since 1972; these regulations targeted municipal point sources (e.g. wastewater treatment plants) and industrial site discharges (e.g. “end of pipe” or canal). In 1987, amendments to the CWA established a framework for regulating nonpoint source (NPS) stormwater discharges under the National Pollutant Discharge Elimination System (NPDES). Although these regulations have been in place for twenty to thirty years, it wasn’t until 1990 that the SWRCB adopted the EPA Phase I regulations and implemented the NPDES stormwater permits for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people or more)

Section 4 ***Integration of Water Management Strategies***

municipalities and for large construction sites (sites that will disturb five acres or greater or will disturb less than five acres but is a part of a larger common site greater than five acres).

It was at this time that the management of urban runoff, including construction sites, received serious attention and significant funding. Only a small percentage of costs that predated the stormwater permits remained the same of the municipalities that participated in the cost survey; most stormwater management activities and related costs were a result of the stormwater regulations.

There are multiple fronts to controlling, managing, and regulating stormwater runoff. The SWRCB has adopted the three categories for which NPDES General Permits were written (and routinely revised and reissued): Industrial, Municipal, and Construction. Institutions such as universities or small facilities have most frequently been covered under the Municipal General Permit, which the SWRCB has entitled the Municipal Storm Water Permitting Program. Military bases and other “Federal facilities need to follow the requirements as they apply to their facilities. The construction activity permit program, the MS4 permit program, and the industrial permit program all apply to military and other Federal installations.” (US EPA 2004). If required to obtain coverage for stormwater discharge, every business, institution, or facility has the right to apply for an Individual Permit versus coverage under the applicable General Permit, although Individual Permits are more onerous for the permittee.

The last category to effectively capture all land-use options is Agricultural, which includes irrigated lands and timberland but not open spaces (e.g. rangelands). Discharges from irrigated agricultural land, be it stormwater runoff or permitted runoff due to irrigating in excess of agronomic rates, has routinely been addressed through SWRCB Conditional Waivers. However, these waivers have undergone recent litigation. As of April 2005, Conditional Waivers for discharges from irrigated lands or timberlands, which have historically been granted versus waste discharge requirements (WDRs), now require a monitoring component to help ensure the discharge does not cause exceedance of water quality standards or impair beneficial uses.

The ARB has long understood the importance of stormwater management. Sacramento, Placer and El Dorado counties all have Stormwater Quality Programs that are designed to do the following:

- To identify and control those pollutants in urban runoff that pose a potential threat to waters of the state and their beneficial uses.
- To comply with the federal NPDES mandate to eliminate or control, to the MEP, the discharge of pollutants in storm water runoff from the MS4s, and to effectively eliminate unauthorized non-storm water discharges.
- To achieve compliance with water quality standards.

- To develop a cost-effective program that focuses on pollution prevention of urban stormwater runoff.
- To seek cost-effective alternatives where prevention is not a practical solution for a significant problem.
- To coordinate implementation of control measures with other agencies.
- Define the mission, vision, objectives, and organizational structure of the Program.
- Describe activities to be conducted during the five-year Stormwater Permit term collectively by the permittees (joint activities) and individually by the Permittees.
- Describe how activities are planned, developed, implemented, and evaluated, through both cooperative and individual efforts of the participating agencies

Stormwater Quality Programs have led to the development of projects designed to improve stormwater management, as shown in **Table 4.1**. **Table 4.1** also demonstrates how stormwater management integrates with other water management strategies to ensure that multiple regional objectives can be met without neglecting other regional objectives.

4.1.7. Flood Management

Flood events have plagued the Sacramento region since being founded in the 1840's. In 1878, State Engineer William Hammond Hall developed the first comprehensive flood control plan which gained federal financial authorization in 1917. The Flood Control Act of 1944 authorized the Army Corps of Engineers to construct Folsom Dam which was completed in 1956. By 1989 after multiple record flood events, the Sacramento Area Flood Control Agency (SAFCA) was formed. As the primary flood management entity within the ARB region, SAFCA is currently focused on achieving the following flood control objectives:

- Improvements to the Natomas Cross Canal levees and the east bank levee of the Sacramento River.
- Modifications to the low-level outlet works at Folsom Dam designed to release flows during early stages of a flood event.
- Continue the variable flood control storage space operations with slight reduction in the maximum space required under this operation.
- Improvements to portions of the north and south levees of the American River and an installation of a closed structure at the mouth of the Mayhew Drain to release emergency spills (116,000 cfs).
- And levee improvement designed to increase conveyance capacity of the South Sacramento, Streams Group (SSSG) and protect southern portions of the City and County from flood water of the Cosumnes and Mokelumne Rivers.

Section 4
Integration of Water Management Strategies

As shown in **Table 4.1**, many of the projects within the region have flood management components. **Table 4.1** also demonstrates how flood management integrates with other water management strategies to ensure that multiple regional objectives can be met without neglecting other regional objectives.

4.1.8. Water Recycling

Many water agencies (that also provide wastewater treatment) within the ARB have existing recycled water programs:

- City of Galt
- City of Lincoln
- City of Roseville
- El Dorado Irrigation District
- Rancho Murieta CSD
- SRCSD

Recycled water is considered a near drought-proof water supply in that it is available regardless of hydrologic conditions, making recycled water an extremely reliable (and valuable) source of water supply. The use of non-potable water for irrigation decreases the need for potable water used as irrigation and relieves some of the demand on potable water supplies as the urban demand increases. Although most recycled water programs in the region are in their infancy, it is anticipated that as much as 50,000 AF/year of recycled water could be used to meet non-potable demands by 2030. These non-potable demands will be met in part by incorporating the projects/programs found in **Table 4.1**. **Table 4.1** also demonstrates how water recycling integrates with other water management strategies to ensure that multiple regional objectives can be met without neglecting other regional objectives.

4.1.9. Water Conservation

Water conservation is of vital importance for the region and statewide as population increases and the demand for water increases. Conserved water will need to be available to help supply increasing demands and minimize the need for increased groundwater pumping and increased use of surface water, including water diverted from the American and the Sacramento Rivers.

As part of the Water Forum, water purveyors in the region have agreed to implement certain best management practices (BMPs) in an effort to reduce customer demands and conserve water. The BMPs were adapted from the Statewide Memorandum of Understanding (MOU) Regarding Urban Water Conservation Best Management Practices and have been customized for use by the Water Forum. As part of the Water Forum Successor Effort, water conservation measures may be adjusted based on BMPs adopted or amended by the California Urban Water Conservation Council (CUWCC). In no instances will water conservation measures fail to meet negotiated Water Forum criteria.

Additionally, purveyors have agreed to implement Water Conservation Plans that provide a means for identifying and reporting their progress toward implementation of the BMPs and to confirm that the Conservation Element of the WFA is being implemented. Water purveyors have provided annual reports on the success or failure of their BMPs efforts and have made adjustments to their BMP implementation as necessary since 2000. The Water Conservation Plans are to be updated every five years and are currently under review.

The Water Conservation Plans are more fully detailed in the WFA Purveyor Specific Agreements, but generally each plan must provide the following:

- Description of how the purveyor will implement each BMP.
- Annual targets, staffing, and budgets for the first year of full implementation (the beginning of the fourth year after Agreement signing).
- Description of how the purveyor will implement its citizen involvement program.
- Past (at least from 1975 on) and projected total water use to the year 2030 – demonstrating consistency with assumptions used in Water Forum Agreement.
- Past (at least from 1975 on) and projected per capita water use to the year 2030.

Federal contractors (and sub contractors) receiving water from the Central Valley Project must also meet the water conservation requirements of the Central Valley Project Improvement Act (CVPIA) which is in some ways more stringent than, but independent of the Water Forum Agreement. Water conservation efforts will be met in part by incorporating the projects/programs found in **Table 4.1**. **Table 4.1** also demonstrates how water conservation integrates with other water management strategies to ensure that multiple regional objectives can be met without neglecting other regional objectives.

4.1.10. Water and Wastewater Treatment

As shown in **Section 2**, there are a number of agencies providing water and wastewater treatment in the region which are more fully described in this section.

4.1.10.1. Water Treatment

Water for domestic, incidental and irrigation uses is supplied by purveyors fitting into five several categories: including county water agencies, dependent water districts, independent water districts, cities, private and mutual water companies. Water is typically derived from wells, surface water, recycled water or combinations thereof. Generally the purveyors maintain and operate the distribution system. The following purveyors serve the region:

Section 4
Integration of Water Management Strategies

County Water Agencies

The Sacramento County Water Agency (SCWA) is a County Water Agency and is the only known dependent water district in the region. SCWA is operated by the Sacramento County Department of Water Resources and is authorized to perform water supply, drainage and flood control for all of Sacramento County.

Placer County Water Agency is also a County Water Agency, but unlike SCWA, is independent of the Placer County Board of Supervisors.

Independent Water Districts

There are four types of autonomous Independent water districts in the ARB: irrigation districts, California water districts, community service districts, and County water districts. Autonomous Independent Water Districts in the ARB are as follows:

Irrigation Districts

- Carmichael Water District
- Citrus Heights Water District
- El Dorado Irrigation District
- Fair Oaks Water District
- Galt Irrigation District

California Water Districts

- Clay Water District
- Omochumne-Hartnell Water District

Community Service Districts

- Rancho Murieta Community Services District
- San Juan Water District

County Water Districts

- Florin County Water District
- Sacramento Suburban Water District
- Del Paso Manor Water District
- Rio Linda Elverta Community Water District

Cities

The Cities of Galt, Folsom, Lincoln, Roseville, Sacramento provide their own water service in accordance with their respective Charters, or in accordance with the Government Code, as applicable.

Private and Mutual Water Companies

There are four private water companies that supply water to the region. These companies must comply with State Statutes set forth in the Public Utilities Code (private for-profit companies) or the Business and Professions Code (mutual water companies). Mutual water companies are similar to public agencies in governance by elected representatives. In contrast, private water companies are regulated by the Public Utilities Commission. Private and mutual water companies include Arden-Cordova Water Service, California-American Water Company, Elk Grove Water Works, Fruitridge Vista Water Company, Golden State Water Company, Tokay Park Water Company (mutual), and Orange Vale Water Company (mutual).

4.1.10.2. Wastewater Treatment

In Sacramento County, all municipal wastewater in the urbanized area north of Elk Grove is treated at the Sacramento Regional County Sanitation District Treatment Facility. Agencies charged with operation and maintenance of the local sewer collection systems includes the City of Folsom, the City of Sacramento and County Sanitation District No. 1. Outside of this service area the following agencies collect and treat wastewater in the region:

- City of Galt
- Rancho Murieta CSD
- Metropolitan Airport
- Boys Ranch
- Rio Cosumnes Correctional Facility

CSD-1 also owns and operates small wastewater treatment facilities at Walnut Grove and Courtland. Sacramento Regional County Sanitation District is currently evaluating the efficiency of regionalizing these facilities.

In Placer County, wastewater in the urbanized areas is treated by the City of Auburn WWTP, Newcastle WWTP, City of Lincoln's wastewater treatment plant, City of Roseville's Pleasant Grove and Dry Creek wastewater treatment plants, and Placer County's wastewater treatment plants. Many wastewater treatment providers, especially those with sufficiently sophisticated treatment technologies, also provide recycled water supplies for beneficial uses. These suppliers and their various programs are listed elsewhere in this IRWMP.

4.1.11. Recreation and Public Access

The lower American River has been designated a “Recreational River” under both the California Wild and Scenic Rivers Act and the National Wild and Scenic Rivers Act. These designations provide state and national recognition, and additional protection of the river’s scenic, wildlife, historic, cultural, and recreational values.

In 1960, the American River Parkway was created to provide protection to the greenbelt and trails along the lower American River. The Parkway includes more than 4,700 acres of parkland with multi-trail uses, picnic areas, boating access sites, swimming areas, golf courses, a group camping area, and a nature center. The trail system of the American River Parkway has been designated a “National Recreational Trail”.

In 1985, the California Legislature acknowledged the Parkway’s statewide significance by adopting the American River Parkway Plan through the passage of the Urban American River Parkway Preservation Act. The plan is a policy document guiding land use decisions to preserve the Parkway’s natural resources while facilitating human enjoyment of the Parkway. It includes goals and policies primarily for recreation, land use and public safety within the Parkway is an element of the general plans of both the City and the County of Sacramento. The plan, which was written in 1985, is being updated.

In 1997, the American River Parkway had more than 6 million visitor-days of use. Visits are projected to increase to 9.6 million visitor-days by 2020, assuming stable river flows and the Department of Water Resources estimates that approximately 460,000 people use the Lower American River for rafting activities each year (Water Forum 2005).

The recreational activities within the Parkway include:

- Boating/rafting
- Fishing
- Swimming
- Picnicking
- Nature study and sightseeing
- Trail use (jogging, bicycling, hiking and equestrian)

Lower American River recreation projects will be funded through the Water Forum Agreement to mitigate effects of increased diversions by Water Forum purveyors on recreation along the Lower American River. Potential projects include increased boating access to the American River, development of trails adjacent to waterways, and purchase of land adjacent to waterways for recreational and environmental values. This will be closely coordinated with the Sacramento County Parks and Recreation Commission.

4.1.12. Watershed Planning

Watershed planning strategies include those projects that are aimed at meeting all broader watershed's goals and objectives.

The Cosumnes River Watershed Inventory and Assessment project has been identified as a project supporting this strategy. It is a watershed management planning documents that characterizes the geographic area, and identifies ways to help restore the health of these watersheds, through the strategies described in this section. The project's purpose is to gather information necessary to develop a long-range management plan for the Cosumnes River Watershed. The Cosumnes River Task Force (CRTF) has identified that the project's goals are to:

- Inventory and characterize stream channel erosion by subwatershed.
- Develop a map of unsurfaced roads in the entire watershed.
- Estimate relative sediment yield by subwatershed and land-cover/land-use type.
- Monitor and characterize sediment transport.
- Assess watershed conditions and identify resource problems.
- Prepare a watershed assessment report.
- Develop an extensive community outreach program.

The CALFED Ecosystem Restoration Program has targeted the Cosumnes River Watershed for restoration of seasonally flooded habitat, tidal wetlands, splittail and chinook salmon rearing habitat, sandhill crane habitat, and riparian plant communities. The inventory produced by the Cosumnes River Watershed Inventory and Assessment will be used to promote the CALFED Program's mission to restore ecosystem health by identifying problems in the Cosumnes River Watershed and by providing an information base for future watershed planning efforts. This project also supports water quality improvement and fish and wildlife habitat enhancement by prioritizing and recommending areas and resources for treatment to reduce erosion, sediment, and flood damage.

The inventory will be used to develop a watershed management plan. The resulting watershed management plan will guide resource planning, restoration, enhancement, and water quality improvements in the watershed.

Information collected from previous studies, ongoing studies, and new data collection efforts is used to develop a watershed conditions assessment identifying resource problems throughout the watershed. Based on stakeholder meetings led by the CRTF, there is a strong local desire to complete a comprehensive watershed plan for the Cosumnes River Watershed. Other ongoing studies are collecting

Section 4
Integration of Water Management Strategies

some, but not all, data necessary to specifically support a watershed planning effort. This project provides the additional information needed to fully support the development of a watershed management plan.

To ensure extensive stakeholder involvement, the extensive public outreach and education is coordinated and facilitated by the CRTF. CRTF has demonstrated successful integration of watershed efforts over the past 5 years. Outreach activities include coordination with related watershed organizations, such as the Mokelumne-Cosumnes Watershed Alliance, monthly updates on the CRTF website regarding project progress, a quarterly newspaper, and public meetings to present preliminary and final conclusions and to get public input.

4.1.13. Land Use Planning

Land use planning can often be improved by a careful review of the linkages between land use and development decisions and water supply availability and reliability. The availability of water supplies, protection of water resource features such as streams, wetlands and recharge areas, and policies and regulations about water quality, drainage and flooding all play a role in future development.

Water resource planning efforts in the ARB take into consideration land use plans identified in the General Plans for each city/county. Land use planning projections provide the basis for establishing water supply projections and identifying habitat areas that will need to be protected against impacts associated with urban development. Land use plans will continue to play an important role in developing effective water management strategies for the ARB.

The ARB has created an integrated approach to land use planning as part of a regional water supply and environmental protection program through the Water Forum Agreement. The Agreement specifies how much water and the type of supply each of the area's water purveyors can use (depending on hydrologic conditions) over the next 30 years. The parties agreed to create a procedure to track water supply and demand and formally integrate land use planning and water supply decisions on a "real time" basis. The Water Forum Successor Effort has carried this work forward and has established a tracking procedure for water purveyors and land use agencies.

A function of the Water Forum is to compile water demand and supply data annually that will be available by regional entities members to evaluate water supply reliability when a major development project is proposed, when a county or any of the cities in the Sacramento region develop a new or revised general or specific plan, or a LAFCO decision regarding annexation or sphere-of-influence changes. When a development proposal or plan has been prepared, a city council or county board of supervisors

reviews the project. The review process does not “tie the hands” of land use agencies regarding the approval or denial of the plans and projects, but bases the project review on up-to-date water supply and demand data.

4.2. Water Management Strategies Not Applicable to the ARB IRWMP

The following water management strategies were considered, but were ultimately determined to not be applicable to the ARB IRWMP.

4.2.1. Water Transfers

While various water agreements between water agencies exist within the ARB for conjunctive use purposes, the need to transfer water is not currently present. Therefore, water transfers are not considered to be an ARB water management strategy. However, as supply and demand conditions continue to evolve, water purveyors within the ARB may find that it is necessary or beneficial to transfer water into or out of the ARB. At that time water transfers would be considered for inclusion as an ARB water management strategy and reflected in IRWMP updates accordingly.

4.2.2. Imported Water

The ARB is considered an ‘area of origin’ and does not anticipate the need to import water. Therefore, imported water is not considered to be an ARB water management strategy.

4.2.3. Surface Storage

The ARB does not anticipate the need to store additional surface waters. Therefore, surface storage is not considered to be an ARB water management strategy.

4.2.4. Desalination

The ARB does not anticipate the need to desalinate water. Therefore, desalination is not considered to be an ARB water management strategy.

4.3. Integration of Water Management Strategies Included in the IRWMP

The water management strategies discussed previously were evaluated for their ability to achieve the IRWMP objectives. The water management strategies that are included in the plan and the objectives they assist in addressing are shown in **Table 4.1**. As shown in this table, multiple water management strategies were found to contribute to each objective. Combining multiple water management strategies to achieve a single objective provides many benefits.

4.3.1. Added Benefits of Integration of Multiple Water Management Strategies

Combining multiple water management strategies to achieve multiple objectives allows for a diversified approach to problem solving. Each water management strategy considered will address specific objectives and span one or more categories. By integrating multiple water management strategies, each aspect of each objective is addressed by one or more strategies, resulting in a more comprehensive solution. As shown in **Table 4.1**, multiple water management strategies address all elements of the objectives for each category and provide redundancy across the objectives.

Projects/programs that meet multiple objectives are generally considered to be of higher benefit and priority. A prioritization assessment of existing projects ready for implementation was used to identify projects/programs that would be recommended in the ARB IRWMP and can be found in **Table 5.1**. The immediate projects/programs to be implemented were identified based on existing planning recommendations and through a collaborative approach with the partners and stakeholders consistent with ARB IRWMP standards. Projects/programs that meet the goals and objectives of the ARB IRWMP, provide multiple benefits, were developed through a collaborative approach, and are ready for implementation are the basis for the first cycle implementation grant application.